

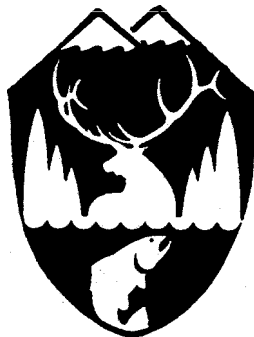
# IDAHO DEPARTMENT OF FISH AND GAME

Jerry M. Conley, Director

## FEDERAL AID IN FISH RESTORATION

### Job Performance Report

Project F-71-R-13



## REGIONAL FISHERIES MANAGEMENT INVESTIGATIONS

Job No. 4-a.	Region 4 Mountain Lake Investigations
Job No. 4-b.	Region 4 Lowland Lake and Reservoir Investigations
Job No. 4-c.	Region 4 River and Stream Investigations
Job No. 4-d.	Region 4 Technical Guidance

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February 1990

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JOB PERFORMANCE REPORT

State of: Idaho

Name: Regional Fishery Management  
Investigations

Project No: F-71-R-13

Job No.: 4-a

Title: Region 4 Mountain Lake  
Investigations

Period Covered: July 1, 1988 to June 30, 1989

ABSTRACT

Regional personnel stocked 23 mountain lakes with 15,900 Westslope cutthroat trout, 21 lakes with 13,400 rainbow trout, and 2 lakes with 10,000 grayling. All fish were fingerlings except for 100 brown trout catchables stocked in Box Canyon Lake #2.

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## OBJECTIVE

To maintain information for fishery management activities and decisions for mountain lakes.

## RESULTS

High mountain lake work in Region 4 was limited to stocking lakes with fingerling fish in August and September. Fingerlings were planted in all lakes from a helicopter, except for the Independence lakes where pack stock was used to transport the fish. A total of 21 lakes received 12,900 Westslope cutthroat trout Oncorhynchus clarki, 17 lakes received 11,300 Mt. Lassen rainbow trout Oncorhynchus mykiss, and 2 lakes received 10,000 grayling Thymallus arcticus (Table 1). We also stocked two lakes with 3,000 cutthroat trout and four lakes with 2,100 rainbow trout in Regions 3 and 6.

Box Canyon Lake #2 was stocked via helicopter with 100 catchable size (6.8/kg) brown trout Salmo trutta on September 7, 1988. This experimental plant was made to see if a stunted brook trout Salvelinus fontinalis population could be reduced.

## ACKNOWLEDGMENTS

The U.S. Forest Service, Sawtooth National Forest, provided the helicopter time to stock the high mountain lakes.



Table 1. Back country lakes stocked by Region 4 personnel in 1988. Lakes are stocked by helicopter unless otherwise noted.

National forest	Drainage/Lake	Catalogue number	Species <sup>a</sup>	Numbe of
Sawtooth	Raft River <sup>b</sup>			
	Independence #1	05-00-00-0223	CT	1,000
	Independence #2	05-00-00-0224	CT	1,000
	Independence #2	05-00-00-0224	GR	9,000
	Independence #3	05-00-00-0225	CT	500
Sawtooth	Little Wood River			
	Box Canyon #1	11-00-00-0111	CT	500
	Box Canyon #2	11-00-00-0112	BN	100 <sup>c</sup>
	Windy	11-00-00-0114	CT	500
	Nip N'Tuck	11-00-00-0115	CT	500
Sawtooth	Big Wood River			
	Little Lost	11-00-00-0152	CT	500
	Big Lost	11-00-00-0153	CT	1,000'
	Big Lost	11-00-00-0153	GR	1,000
	Amber	11-00-00-0155	CT	500
	Window	11-00-00-0156	CT	500
	Hidden	11-00-00-0158	CT	500
	Norton #1	11-00-00-0160	RB	1,000
	Norton #2	11-00-00-0161	RB	1,000
	Miner	11-00-00-0164	CT	500
	Prairie Cr. #1	11-00-00-0166	RB	500
	Titus Cr.	11-00-00-0171	CT	500
Sawtooth	South Boise River			
	Heart	10-00-00-0164	CT	700
	Boardman	10-00-00-0165	RB	500
	Deadwood	10-00-00-0166	RB	500
	Goat		10-00-00-0167	
	RB	1,000		
	Little Bear Cr.	10-00-00-0169	CT	500
	Perkons	10-00-00-0170	RB	800
	Bass Cr. #1	10-00-00-0171	RB	500
	Bass Cr. #2	10-00-00-0174	RB	500
	S.F. Ross F. Cr. #1	10-00-00-0176	CT	500
	S.F. Ross F. Cr. #2	10-00-00-0177	CT	500
	S.F. Ross F. Cr. #4	10-00-00-0179	RB	500
	Johnson Cr.	10-00-00-0182	RB	500

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Table 1. (Continued)

National forest	Drainage/Lake	Catalogue number	Species <sup>a</sup>	Number of fish
Boise	South Fork Boise River			
	North Star	10-00-00-0119	RB	500
	Potter	10-00-00-0122	RB	500
	Smith	10-00-00-0123	RB	500
	Hideway	10-00-00-0127	CT	500
	Green Cr.	10-00-00-0133	CT	500
	Fiddle	10-00-00-0141	CT	700
	Big Lookout	10-00-00-0142	CT	1,000
	Middle Rainbow	10-00-00-0151	RB	1,000
	Big Rainbow	10-00-00-0152	RB	1,000
	Heart	10-00-00-0153	RB	500
Boise	Middle Fork Boise River <sup>d</sup>			
	Three Sisters 12	10-00-00-0195	RB	500
	Three Sisters 13	10-00-00-0196	RB	500
	Leggit	10-00-00-0262	RB	600
	Twin Sisters S (Big Buck)	10-00-00-0187	RB	500
	Twin Sisters N (Surprise)	10-00-00-0186	CT	500
Challis	Big Lost River <sup>e</sup>			
	Kane Canyon	15-00-00-0208	CT	2,500

<sup>a</sup>CT = Westslope cutthroat, BN = Brown, GR = Grayling, RB = Mt. Lassen rainbow.

<sup>b</sup>Stocked by pack horse.

<sup>c</sup>Catchable size 6.8 fish/kg.

<sup>d</sup>Region 3.

<sup>e</sup>Region 6.

## JOB PERFORMANCE REPORT

State of: Idaho Name: Regional Fishery Management  
Investigations

Project No: F-71-R-13

Job No.: 4-b Title: Region 4 Lowland Lake and  
Reservoir Investigations

Period Covered: July 1, 1988 to June 30, 1989

### ABSTRACT

Due to drought conditions in 1988, fish salvage operations were conducted in and below Magic Reservoir resulting in approximately 2,700 kg of fish being moved to Lower Salmon Falls Reservoir.

Fish sampling in Anderson Ranch Reservoir in September 1988 to verify past reproduction of fall chinook salmon was unsuccessful. Game fish caught by electrofishing and gill and trap netting included 158 kokanee, 7 hatchery trout, 6 wild rainbow trout, 10 smallmouth bass, and 5 mountain whitefish. Summer sampling to determine kokanee population status was cancelled due to low water levels in the reservoir.

Electrofishing Morrow Reservoir in July 1988 collected 143 largemouth bass and 10 black crappie. Largemouth bass ranged from 136 to 259 mm in length. Growth rates declined sharply after age-2 for largemouth bass.

Hatchery catchable rainbow trout return estimates for tagged fish released in 1987 were: 24% in Lower Salmon Falls Reservoir, 9% in Milner Reservoir, and 4% in the Snake River at Glenns Ferry. For trout released in 1988, the rates were: 7% in Emerald Lake, 7% in Lake Walcott, and 22% in the South Fork Boise River above Featherville.

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## OBJECTIVE

To maintain information for fishery management activities and decisions for lowland lakes and reservoirs.

## RECOMMENDATIONS

1. Monitor water temperatures, dissolved oxygen levels, and fish densities in the Big Hole below Magic Reservoir prior to and after the outlet gates are closed during low water years.
2. Pursue stocking techniques to improve return rates for hatchery catchables in important fishing waters.
3. Determine if poor growth rates for largemouth bass in Morrow Reservoir are forage or habitat related.
4. Continue to monitor kokanee and fall chinook salmon populations in Anderson Ranch Reservoir.
5. Develop methods to stabilize kokanee populations in Anderson Ranch Reservoir.

## TECHNIQUES USED

Reservoir electrofishing was generally done at night. A Smith-Root Model SR-18 electrofishing boat powered by a 5,000 watt generator and equipped with a Model 5.0 pulsator was used. Normal sampling consists of using a pulsed DC mode (60 pps, 60% duty cycle). Samples are collected near shore in 0.5 to 3 m of water. Game fish collected are identified to species, and total length (mm) and weight (g) are measured.

Two types of gill nets are used depending on sampling objectives. General surveys use 38 x 1.8 m nets with five different sections varying from 19 to 64 mm square mesh size. Nets used to sample specifically for large fish are 30 x 1.8 m with 102 mm square mesh netting.

Conservation officers and other regional personnel recorded information on angler effort and success on the general opener (May 28, 1988) and during random creel checks during the rest of the year on Region 4 waters.

Catchable rainbow trout Oncorhynchus mykiss return rates were evaluated by marking the fish with size 8 monel jaw tags. Five to ten percent of each tag group had reward tags, with the remaining portion being marked with plain numbered tags. All tags were marked "return to IDFG". Fish were then stocked in either June or July. Harvest estimates were corrected for unreturned tags by comparing the return rates of regular and reward tags using the following:

Harvest = Tagged fish caught/Tagged fish released

where Tagged fish caught = Tags returned/Compliance rate.

The compliance rate was estimated as follows:

$$\text{Compliance rate} = 100\% - (T_w - T_r)/T_w$$

where  $T_w$  = Percent return of reward tags and  
 $T_r$  = Percent return of regular tags.

Growth rates of largemouth bass Micropterus salmoides and black crappie Pomoxis nigromaculatus were determined from scales taken from fish collected by electrofishing. Scales were pressed between acetate slides and the resulting slides were read on a microfiche projector. Length-at-age was back-calculated using the Fraser-Lee method with standard y-intercept values of 20 and 35 mm for largemouth bass and black crappie, respectively (Carlander 1982).

## RESULTS

### Anderson Ranch Reservoir

Anderson Ranch Reservoir is an oligotrophic reservoir located on the South Fork Boise River (Partridge 1988). The main fishery is for kokanee Oncorhynchus nerka, followed by rainbow trout, smallmouth bass Micropterus dolomieu, yellow perch Perca flavescens, and bull trout Salvelinus confluentus. Fall chinook salmon O. tshawytscha were stocked in 1982-84 to provide a trophy fishery.

Fish were collected in the upper end of Anderson Ranch Reservoir on September 22-23, 1988, with gill and trap nets and by electrofishing to check for the presence of fall chinook salmon. Night electrofishing along the shoreline near the mouth of Lime Creek sampled 31 kokanee, 5 hatchery and 5 wild rainbow trout, 10 smallmouth bass, and 5 mountain whitefish Prosopium williamsoni. Two gill nets (102 mm sq. mesh) set overnight (at the mouth of Lime Creek and on the opposite side of the reservoir) caught 20 kokanee and 1 northern squawfish Ptychocheilus oregonensis. A trap net placed near the mouth of the South Fork Boise River for 3.5 hours in the evening caught 107 kokanee, 13 sucker Catostomus sp., 1 wild rainbow trout, and 2 hatchery rainbow trout. Fall chinook salmon were not observed at any site.

Rainbow trout sampled in Anderson Ranch Reservoir included both hatchery catchables from 1988 and 1987 which ranged in size from 255 to 550 mm (Figure 1). Wild or hatchery fingerling releases ranged from 225 to 535 mm. Two age-classes of mature kokanee appeared to be present with one size group ranging from 270 to 345 mm. One 465 mm female kokanee was sampled. Smallmouth bass ranged from 65 to 350 mm with a mean size of 206 mm. Mountain whitefish collected were 110, 125, 130, 130, and 280 mm in length.

Trawling in Anderson Ranch Reservoir to estimate kokanee population and age-class structure was canceled due to low water levels. By early July, all boat ramps were out of the water.

### Morrow Reservoir

Morrow Reservoir is a small impoundment (24 ha) on Little Canyon Creek about 10 km northwest of Glenns Ferry, Idaho (Grunder et al. 1987). Populations of yellow perch, black crappie, largemouth bass, and brown bullhead Ictalurus nebulosus are present.

On July 21, 1988, fish were sampled by electrofishing in Morrow Reservoir. One complete circuit of the reservoir was made. A total of 143 largemouth bass and 10 black crappie were collected. Black crappie ranged from 186 to 259 mm (mean 219 mm), and largemouth bass ranged from 136 to 291 mm (mean 239 mm) (Figure 2). Since no largemouth bass sampled were over 300 mm, population stock density was not calculated. Relative weights for largemouth bass were good (>114%) for fish under 175 mm but declined as size increased to 90% for fish in the 275-299 mm length group (Table 1).

Largemouth bass in Morrow Reservoir were up to **five** years old (Table 2). Growth rates were good for age-1 and -2 bass but declined sharply after age-2. Two year-classes (1983, 1985) of black crappie were sampled (Table 3).

### Magic Reservoir

Magic Reservoir is a 1,500 ha reservoir located on the Big Wood River in Blaine and Camas counties, Idaho (Partridge 1988). It is an irrigation storage reservoir and is subject to large drawdowns. Two years of drought conditions in southern Idaho resulted in the earliest reservoir drawdown on record for Magic Reservoir. With the depletion of usable storage, the outlet gates at the dam were closed on July 3, 1988. The combination of no flow, warm water temperatures, low dissolved oxygen levels, and high fish densities in the Big Wood River below the dam resulted in a large die-off of fish. An estimated 3,000 trout were lost in the Big Hole below the dam.

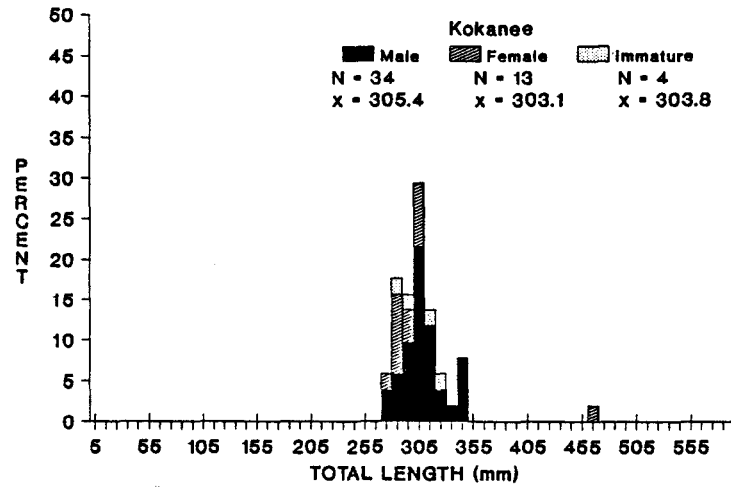
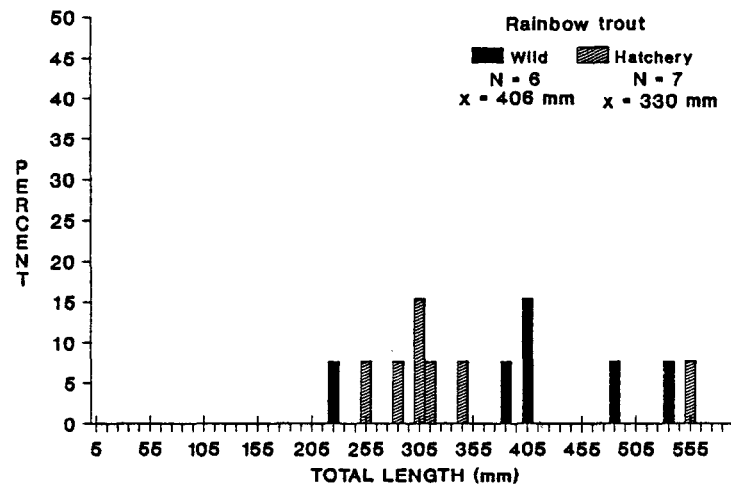
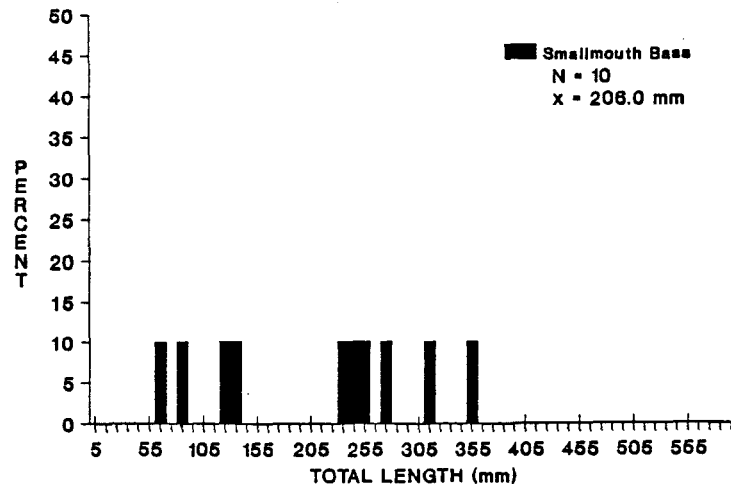


Figure 1. Length frequency of game fish sampled in Anderson Ranch Reservoir on September 22-23, 1988.



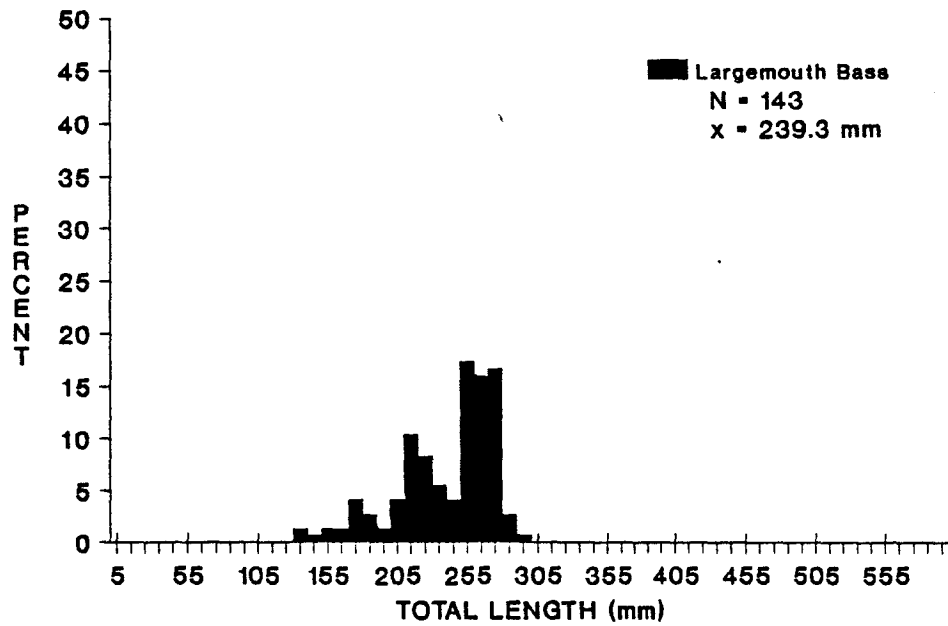
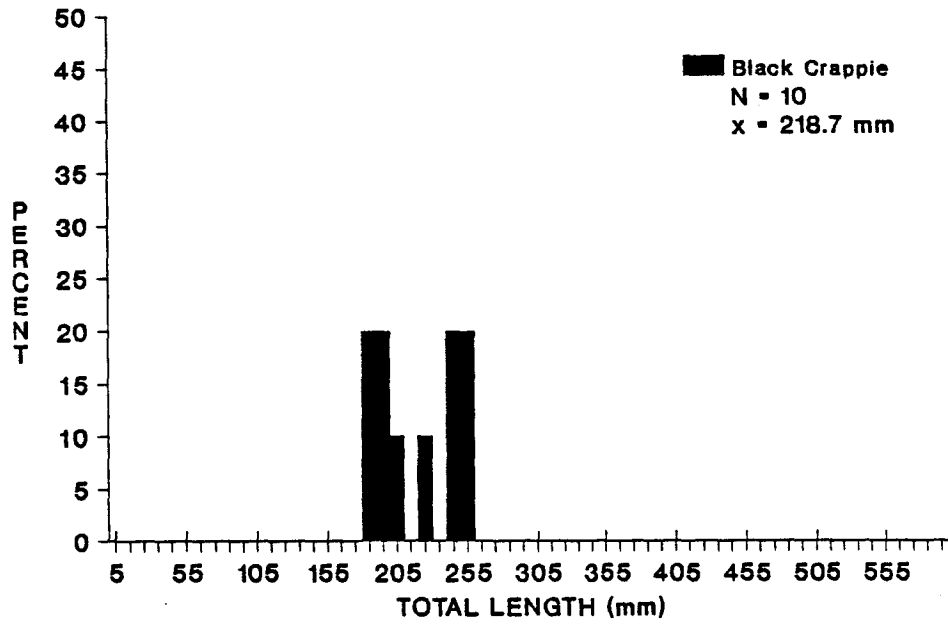


Figure 2. Length frequency of black crappie and largemouth bass sampled by electrofishing in Morrow Reservoir on July 21, 1988.

Table 1. Mean relative weights per 25 mm length groups for black crappie and largemouth bass sampled by electrofishing in Morrow Reservoir, 1988.

Length group (mm)	Number	Relative weight
Black crappie		
175-199	4	112
200-224	1	106
225-244	2	118
250-274	2	104
Largemouth bass		
125-149	3	120
150-174	6	114
185-199	10	108
200-224	29	102
225-249	18	100
250-274	63	95
275-299	14	90

Table 2. Back-calculated length-at-age (mm) and **yearly** growth increment for largemouth bass collected from Morrow Reservoir, 1988.

Year class	No. of fish	Mean length at annulus				
		1	2	3	4	5
1987	3	77				
1986	55	88	169			
1985	21	98	182	233		
1984	36	90	166	217	248	
1983	16	83	160	209	239	263
Weighted average length		89	170	220	245	263
Increment of growth		89	81	50	25	18

Table 3. Back-calculated length-at-age (mm) and yearly growth increments for black crappie collected from Morrow Reservoir, 1988.

Year class	No. of fish	Mean length at annulus				
		1	2	3	4	5
1985	6	65	118	166		
1983	3	66	111	163	215	240
Weighted average length		65	116	165	215	240
Increment of growth		65	51	49	50	25

Water was again released from Magic Dam during July 28 to August 3, 1988, resulting in additional fish being flushed from the reservoir. To avoid additional fish losses, salvage operations were conducted in the Big Hole below Magic Reservoir following the closing of the gates and as the hole was being drained for the construction of a powerhouse. An estimated 2,700 kg of fish were collected and transported to Lower Salmon Falls Reservoir (Bell Rapids). Fish salvaged were predominately rainbow trout but included brown trout Salmo trutta, yellow perch, and two smallmouth bass.

During 1988, Magic Dam was retrofitted to produce electrical power. During construction of the powerhouse, the Big Hole was drained and then excavated resulting in a doubling of its volume. Hopefully this increase in size will reduce future die-off problems. Even with this size increase, the area should be monitored prior to and during the closing of the dam gates during the summer (prior to mid September).

On August 10, 1988, approximately 500 wild rainbow trout were collected from the Big Wood River above the Richfield Diversion and transported to the Hagerman State Fish Hatchery. The fish were collected to prevent the loss of this stock if conditions in the river below Magic Dam resulted in a complete fish-kill. Approximately 350 of these fish survived until they were restocked in the Big Hole below Magic Dam on January 5, 1989.

Due to low water levels in Magic Reservoir, bag limits were removed to allow anglers to utilize the fish. Bag limits were also removed on Fish Creek, Little Camas, Morrow, Thorn Creek, and Oakley reservoirs.

### Catchable Trout Evaluations

#### **1987 Tag Releases**

Lower Salmon Falls Reservoir-Jaw tags from hatchery catchable rainbow trout (Mt. Lassen strain) released into Lower Salmon Falls Reservoir on July 14, 1987, continued to be returned during the March 1, 1988 to February 28, 1989 period. An additional 64 regular and 3 reward tags were returned, bringing the total to 556 regular and 57 reward tags. A total of 5,000 regular and 250 reward tags were released. A noncompliance rate of 51.2% was calculated resulting in an estimated harvest of 24% (1,257 trout). Grunder et al. (1989) estimated the percent return from creel survey data to be 22% in 1987. Size of fish caught in 1988 averaged 372 mm (N=23) and 730 g (N=13) based on angler reported data. At release the fish were 225 to 250 mm in length and 160 g.

In 1987, 7.9% of the tag returns were from the river below the Lower Salmon Falls Dam, while in 1988 the percent of the returns in this area increased to 19.42. Tagged fish were caught as far down river as Glenns Ferry, approximately 60 km downriver.

**Milner Reservoir**-During March 1, 1988 to February 28, 1989, anglers returned 15 regular jaw tags from catchable rainbow trout (Mt. Lassen) released into Milner Reservoir at Burley. Prior returns in 1987 and early 1988 accounted for 23 regular and 8 reward tags, for a total return of 38 regular and 8 reward tags. The release on July 14, 1987, consisted of 2,000 regular and 100 reward tags. Noncompliance was estimated at 76%, and an estimated harvest was 194 fish (9%). A portion of the fish moved downriver, with 24% of the tag returns being reported in the canal systems leaving the reservoir.

Although returns were low, growth was reported to be excellent. Lengths of two fish caught in April 1988 were 355 and 430 mm. A fish caught in November 1988 was 530 mm and 2.5 kg.

**Snake River at Glenns Ferry**-In 1988, anglers returned an additional five tags from the July 14, 1987, release of catchable rainbow trout (Mt. Lassen) at Glenns Ferry. Previously, anglers had returned 41 of 2,000 regular tags and 1 of 100 reward tags, resulting in a total of 46 regular tags and 1 reward tag. Due to the low percentage of reward tags returned, a site specific noncompliance rate was not calculated. Based on the 2% of the tags which were returned, and the compliance rates at Milner and Lower Salmon Falls reservoirs, 4 to 8% of the fish were harvested.

#### **1988 Tag Releases**

**Emerald Lake**-On June 21, 1988, 1,000 jaw-tagged catchable rainbow trout were released in Emerald Lake, Minidoka County. One hundred of the tags were reward tags and the rest were standard tags. The fish (Mt. Lassen strain) averaged 180 g and approximately 250 mm in total length. Anglers returned 23 regular tags and 6 reward tags from June 21, 1988 to February 28, 1989. Based on return rates, a noncompliance rate of 57.4% was estimated, resulting in a harvest estimate of 68 fish (6.8%).

**Lake Walcott**-On June 20, 1988, 2,200 jaw-tagged catchable rainbow trout (Mt. Lassen) were released in Lake Walcott near the dam. Two hundred of the tags were reward tags. The fish averaged 174 g and 250 mm. Anglers returned 34 regular and 12 reward tags during the June 20, 1988 to February 28, 1989 interval. A noncompliance rate of 71.7% was calculated, which resulted in an estimated catch of 162 fish or 7.4% of the release.

Rainbow trout released at the dam showed considerable movement, with 46% of the fish being caught in the river and canals below the dam. Fish also moved up the reservoir to Smith and Gifford springs (30% of the returns), and 1 recapture was reported from the Massacre Rock area above the reservoir. Twenty percent of the returns were reported from the release area at the dam. Probably the major reason for the distribution of the returns is the limited access on the reservoir due to the restrictions of the National Wildlife Refuge.

Growth of hatchery catchables released in Lake Walcott is good, with anglers reporting fish ranging' in size from 315 to 455 mm and up to 1 kg by November.

**South Fork Boise River**-On June 13, 1988, 1,100 jaw-tagged fish were released in the South Fork Boise River from Featherville to Big Smoky Creek. One hundred of the tags were reward tags. The fish averaged 165 g and 245 mm. From June 13 to the end of the season (November 30, 1988), anglers reported catching fish with 21 reward and 137 regular tags. Noncompliance was calculated to be 34.8%, resulting in an estimated harvest of 242 fish or 22.0% of the release.

### **Regional Creel Surveys**

Information was collected on 20 regional waters on the general opener (May 28, 1988). Catch rates ranged from 0.0 fish/hr on Fish Creek Reservoir (only 2 anglers interviewed) to 4.7 fish/hr on the Little Wood River (Table 4). Data from miscellaneous creel checks, which were made on 22 regional waters throughout the year, are presented in Table 5.

### **ACKNOWLEDGMENTS**

Field work in 1988 was planned and supervised by Scott Grunder (Regional Fishery Biologist). Biological aides Steve Elam, Ray Garrison, and Joy Eiman assisted with the collection of field data. Steve Elam assisted with data summarization and analysis. Region 4 conservation officers, regional staff, and hatchery personnel collected creel data.

Table 4. Results of creel checks performed at Region 4 waters on opening day (May 28) of the general fishing season, 1988.

Location	Anglers interviewed	Hours fished	Trout caught	Walleye caught	Fish per hour
Big Wood River	72	150	86		0.6
Billingsley Creek	20	72	77		1.1
Birch Creek	20	51	101		2.0
Boise River, S.F.	45	75	22		0.3
Cassia Creek	26	30	28		0.9
Dog Creek Res.	4	12	19		1.6
Fish Creek Res.	2	3	0		0.0
Hagerman WMA	41	72	42		0.6
Little Wood Res.	51	122	65		0.5
Little Wood River	3	3	14		4.7
Lower Salmon Falls Res.	2	6	7		1.2
Magic Res.	10	44	28		0.6
Malad River	2	2	2		1.0
Rock Creek	69	102	149		1.4
Roseworth Res.	37	62	58		0.9
Salmon Falls Creek Res.	57	133	7	40	0.4
Silver Creek	46	128	72		0.6
Sublett Res.	92	236	65		0.3
Thorn Creek Res.	53	54	151		2.8
Warm Springs Creek	24	20	12		0.6



Table 5. Summary of miscellaneous spot creel checks performed at Region 4 waters during 1988, excluding opening weekend.

Location	Date	Ang Int.	Hours Fished	Catch rate (fish/h) per species <sup>a</sup>											
				HRB	WRB <sup>b</sup>	BN	KOK	MWF	BT	DV	WE	LMB	SMB	YP	BL
Anderson Ranch Res.	Mar-Jul	220	978	0.06	0.04		0.3	<0.01		<0.0			0.01	0.10	
Bear Creek	Jul	2	8						2.38						
Big Smokey Creek	Jul	4	6	2.00											
Birch Creek	Jul	6	9	1.56											
Boise R., S.F.	Jun-Jul	204	814	0.61	0.04			<0.01		<0.0			<0.01		
Deer Creek	Jul	1	4	1.00											
Dredge Ponds	Jul	29	89	1.34											
Hagerman WMA	Jul	93	302	0.32								0.12			0.58
Jarbridge R., E.F.	Jun	16	12		0.42										
Lake Cleveland	Jul	24	40	0.67											
Little Camas Res.	Mar-Jul	41	122	0.18	0.10								0.37		
L. Salmon F. Res.	Aug	5	8	0.82											
Magic Res.	Jun	17	23	0.83	0.30										
Morrow Res.	Apr	9	31	0.78		0.06								0.06	
Oakley Res.	Jul	6	10	1.14											
Roaring Lakes	Jun-Jul	13	33	0.58	0.15										
Roseworth Res.	Jun	18	28	0.32	0.04										
S. Falls Cr. Res.	Jun-Aug	21	56	0.21							0.07		0.09		
Snake River (Below Bliss Dam)	Jan-Sep	93	201	0.22									0.09		
Snake River (Above Milner Res.)	Feb	11	31	0.94											
Trinity Creek	Jul	3	3	3.67											
Trinity Lakes	Jun-Jul	40	128	0.43	0.15										

<sup>a</sup>HRB = Hatchery rainbow trout, WRB = Wild rainbow trout, BN = Brown trout, KOK = Kokanee, MWF = Mountain whitefish, BT = Brook trout, DV = Bull trout, WE = Walleye, LMB = Largemouth bass, SMB = Smallmouth bass, YP = Yellow perch, BL = Bluegill.

<sup>b</sup>includes hatchery fingerling rainbow trout.

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## JOB PERFORMANCE REPORT

State of: Idaho

Name: Regional Fishery Management  
Investigations

Project No: F-71-R-13

Job No.: 4-c

Title: Region 4 Rivers and Stream  
Investigations

Period Covered: July 1, 1988 to June 30, 1989

### ABSTRACT

Fishing effort was estimated to be 8,200 hours (228 hr/km) on the South Fork Boise River between Featherville and Big Smokey Creek during May 28 to October 14, 1988. Anglers caught an estimated 7,750 fish and harvested 5,600 fish. Rainbow trout accounted for 95% of the fish harvested, followed by bull trout (2%), mountain whitefish (2%) and kokanee (1%). Hatchery rainbow trout made up 85% of the rainbow trout harvested. Estimated return-to-the-creel for hatchery catchables was 21%.

An angler opinion survey on the South Fork Boise River found that 60% of the anglers had a good or excellent trip. Over 70% of the anglers were satisfied with the size and abundance of trout caught. Almost all (98%) anglers supported the stocking of hatchery rainbow trout in some portions of the river.

Rainbow trout densities in sections of Lime Creek were estimated to range from 5.1 to 6.4 fish/100 m<sup>2</sup>. In the South Fork Lime Creek densities of rainbow trout were 4.7 and 7.6 fish/100 m<sup>2</sup>. Other species present included mountain whitefish, sculpin sp., sucker sp., and yellow perch. Rainbow trout ranged from 33 to 256 mm in total length.

Drought conditions in southern Idaho affected stream levels throughout the region. Willow Creek, normally a perennial stream, became intermittent during August, resulting in fall fish density estimates being 71% less than in July. Rainbow trout densities were 23 and 9 fish/100 m<sup>2</sup> in July and November, respectively. Brown trout densities for the same periods were 15 and 2 fish/100 m<sup>2</sup>. Fish populations in Shoshone Creek were also low in October, with only four rainbow trout and two brown trout being sampled in 500 m of stream

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In Box Canyon Creek, spawning rainbow trout were observed both in the spring and fall, indicating that the stream is used by both resident and migrating trout populations. Fish population data was also collected from five other regional streams.

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## **OBJECTIVE**

To maintain information for fishery management activities and decisions for rivers and streams.

## **RECOMMENDATIONS**

1. Continue to enhance the fishery in the South Fork Boise River above Anderson Ranch Reservoir with hatchery rainbow trout. Release sites should be in areas of high use, such as developed campgrounds.
2. Continue to work with the U.S. Forest Service to maintain habitat conditions for wild trout populations in the Lime Creek drainage.

## **TECHNIQUES USED**

A stratified random angler survey was conducted on the South Fork Boise River to evaluate fish harvest. The general fishing season was stratified into two-week intervals which were stratified into weekdays, weekend days, and holidays. Weekend days adjoining holidays were classified as holidays. Three random angler counts were conducted on two randomly selected weekdays, two weekend days, and all holidays during each interval. Counts were made by driving along the river and through the major campgrounds between Featherville and Big Smokey Creek. The survey was discontinued after October 14, 1988, due to limited fishing pressure. Data analysis used methods described by Rieman (1983), with seasonal totals being estimated by summing interval totals. Estimates were made both for the entire river reach and for three arbitrarily selected reaches between Featherville and Big Smokey Creek.

Anglers were contacted and interviewed on count day. Information collected included hours fished, fish caught, fish kept, and a portion of the anglers were asked to participate in an opinion survey. Data collected on fish in the creel included species, hatchery or wild, and total lengths.

Stream surveys on other regional waters used techniques reported by Grunder et al. (1987).

## RESULTS AND DISCUSSION

### South Fork Boise River

The South Fork Boise River (SFBR) above Anderson Ranch Reservoir is located in Elmore and Camas counties (Figure 1). It flows mainly through U.S. Forest Service lands and is paralleled by a graded gravel road from Featherville to Big Smokey Creek. Currently, the U.S. Forest Service has six developed campgrounds, along with numerous undeveloped camping sites in this 36 km reach. The reach between the reservoir and Featherville flows through a higher percentage of private land and is separated from the road for about half its length. The river lies in the southern end of the Idaho batholith and, as a result, is low in productivity. At Pine the drainage covers 1,645 sq km and has an average discharge of 22.5 cms (Harenberg et al. 1989). Flows in 1988, which was a low water year, peaked by May 25 at 60 cms and decreased to 3.4 cms in August and September.

Prior to the construction of dams on the Boise River in the early 1900s, the SFBR was an anadromous stream. Currently, the river contains resident populations or migratory populations from Anderson Ranch Reservoir. Gebhards (1964) found the following fish species in the SFBR: wild and hatchery rainbow trout Oncorhynchus mykiss, bull trout Salvelinus confluentus, mountain whitefish Prosopium williamsoni, northern squawfish Ptychocheilus oregonensis, chiselmouth Acrocheilus alutaceus, reidside shiner Richardsonius balteatus, dace Rhinichthys sp., sculpin Cottus sp., and coarse-scale and fine-scale suckers (most likely largescale sucker Catostomus macrocheilus and bridgelip sucker C. columbianus). A smaller fine-scale sucker was observed in the higher tributaries which may be mountain sucker C. platyrhynchus. Kokanee O. nerka, which were introduced into Anderson Ranch Reservoir in the 1950s and 1960s, also use the SFBR for spawning.

### **Angler Effort**

Fishing effort was estimated on the SFBR between Featherville and Big Smokey Creek during May 28 to October 14, 1988. Angler effort was estimated to be 8,200 hours, which would be a minimum estimate due to difficulties observing anglers from the road. Average effort for the 36 km of river was 228 hr/km. Peaks in effort occurred during the 4th of July interval and during August, with effort decreasing after the Labor Day weekend (Figure 2).

Proportionately, more effort occurred in the upper portion of the river. In Section 4 angler effort was estimated at 2,300 hours (483 hr/km) (Table 1). Section 2 had 3,300 hours (187 hr/km) of effort and Section 3, 2,600 hours (195 hr/km).

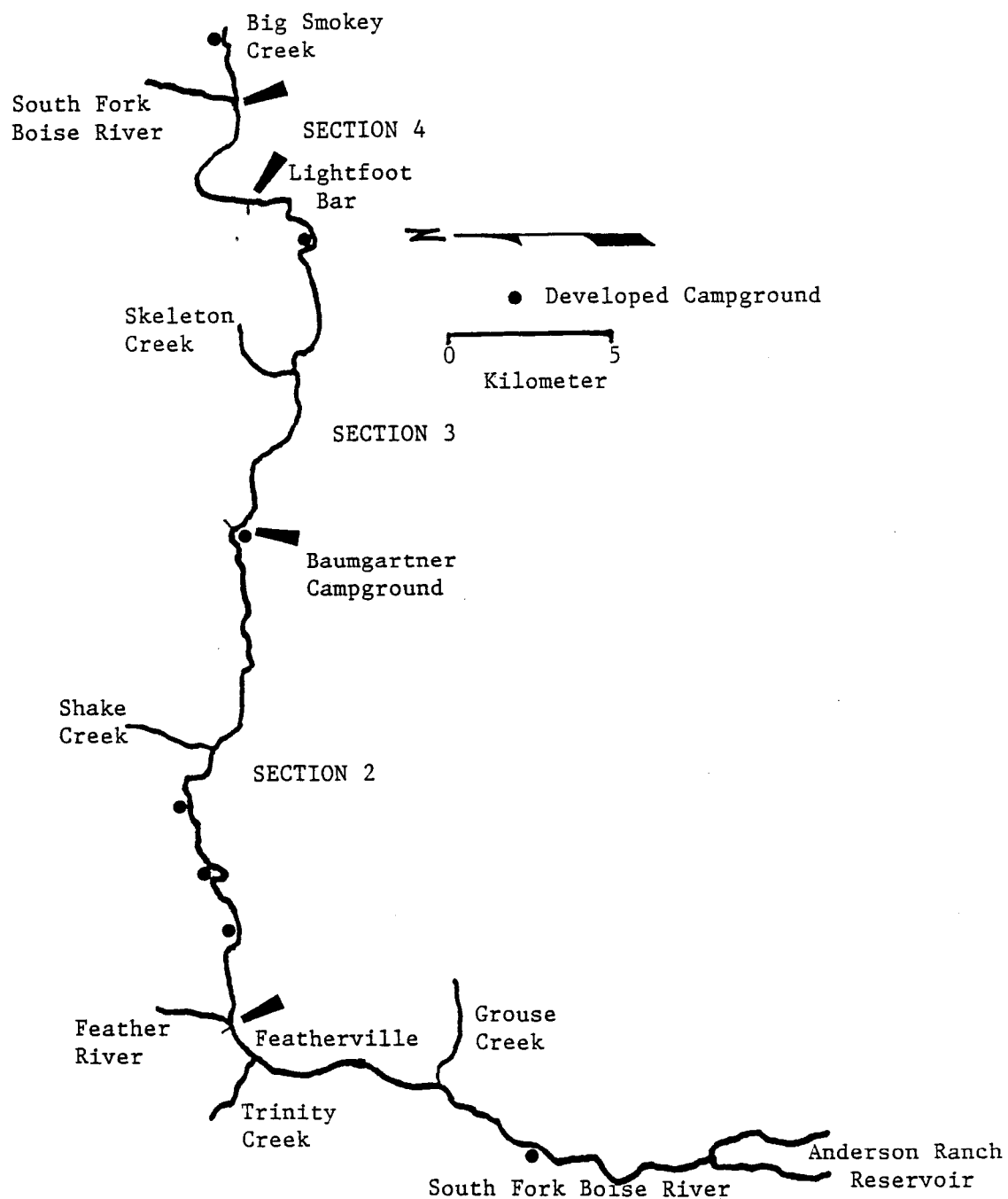


Figure 1. Location of angler survey sections on the South Fork Boise River, Idaho during 1988.

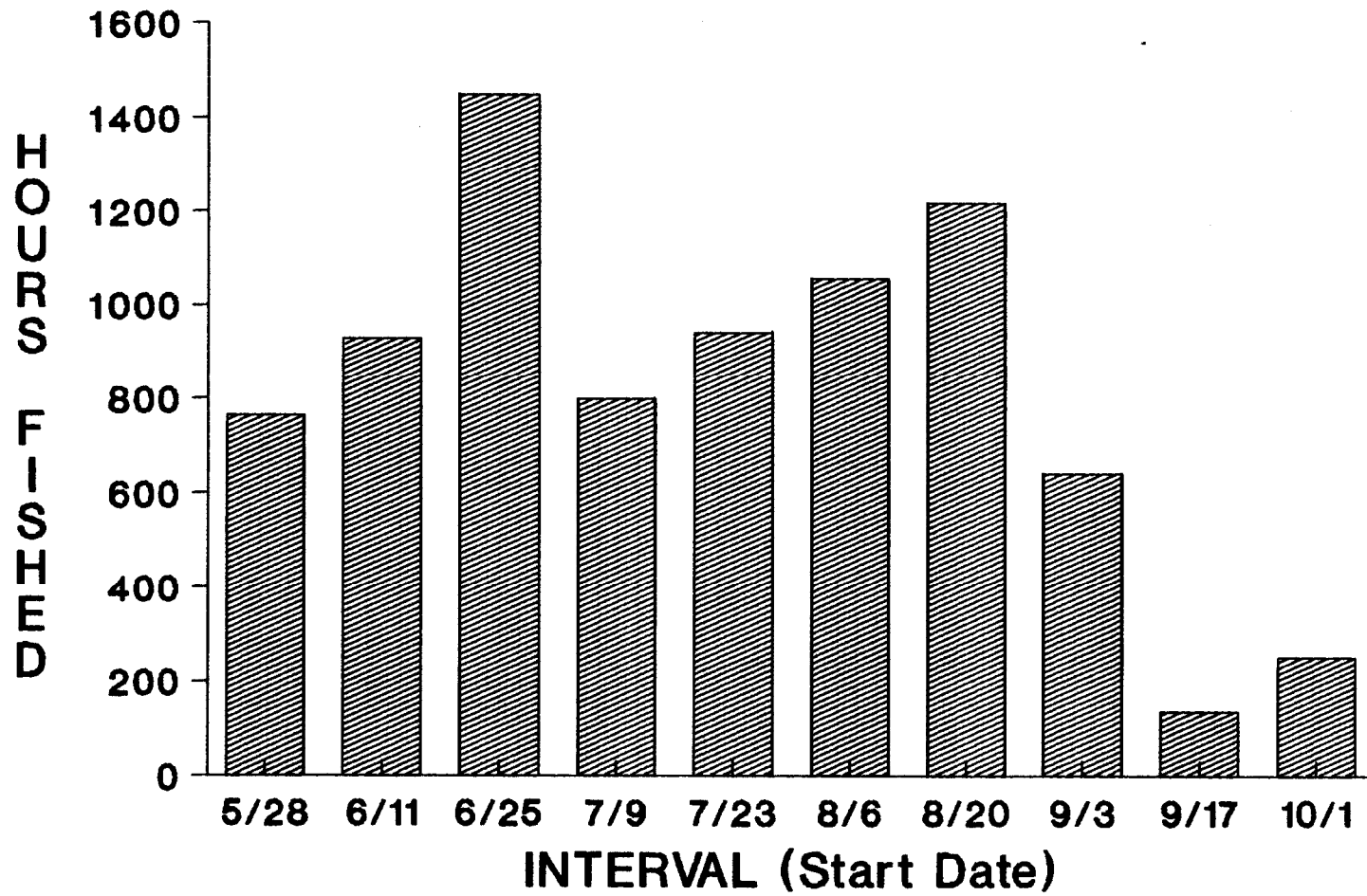


Figure 2. Estimated hours fished by anglers on the South Fork Boise River during each two-week census interval, 1988.



Table 1. Estimated angler effort (hours) on the South Fork Boise River during 1988. Eighty percent error bounds are in parentheses.

Interval	Section 2	Section 3	Section 4	Total
5/28-6/10	383 (189)	219 (113)	161 (80)	764 (234)
6/11-6/24	367 (180)	403 (203)	158 (103)	928 (291)
6/25-7/8	493 (176)	381 (121)	574 (207)	1,449 (297)
7/9-7/22	280 (124)	235 (80)	285 (124)	799 (193)
7/23-8/5	262 (153)	407 (320)	272 (150)	941 (385)
8/6-8/19	173 (73)	500 (207)	383 (148)	1,056 (264)
8/20-9/2	716 (439)	224 (140)	278 (138)	1,218 (481)
9/3-9/16	319 (144)	179 (77)	145 (54)	642 (172)
9/17-9/30	81 (57)	8 (10)	48 (53)	137 (79)
10/1-10/14	183 (80)	55 (51)	13 (12)	251 (96)
TOTAL	3,257 (605)	2,611 (499)	2,317 (380)	8,185 (872)

## Harvest

Anglers caught approximately 7,750 fish (218/km) in the SFBR study area during May 28 to October 14, 1988. Estimated harvest was 5,600 fish (Table 2). Rainbow trout accounted for 95% (7,300) of the fish caught and 95X (4,500) of the fish harvested. Hatchery rainbow trout made up 85% of the rainbow trout harvested and 81% of all fish harvested. Other game fish harvested in the river included bull trout (2.0X), mountain whitefish (1.62), and kokanee (1.2X). Species composition in the creel in 1988 was similar to creel surveys from 1953 to 1963, where rainbow trout made up 84 to 98% of the harvest (Gebhards 1964). Hatchery rainbow trout accounted for 82 to 97% of all rainbow trout creeled. Bull trout made up from 0.4 to 3.7% of the creel and mountain whitefish normally ranged from 0.4 to 6.6% of the creel. Two species that occasionally were reported caught in the SFBR were brook trout Salvelinus fontinalis and cutthroat trout Oncorhynchus clarki.

Anglers harvested approximately 4,500 hatchery rainbow trout, which was 21% of the 21,000 catchables released in the study area in 1988. Comparatively, returns from jaw-tagged fish estimated harvest at 22% (this report, Job 4-b).

Fishing success increased as anglers moved upriver. The overall catch rate in Section 2 was 0.71 fish/hr (Tables 3-5), in Section 3, it was 0.89 fish/hr, and in Section 4, 1.21 fish/hr. Catch per kilometer of river by section was 132/km, 174/km, and 585/km in Sections 2, 3, and 4, respectively.

Bull trout were caught predominately (92X) in Section 3 and mountain whitefish (60%) in Section 4. Kokanee were only caught in Sections 2 and 3, although they were observed spawning upriver as far as Big Smokey Creek. Although no counts were made, it was estimated that a minimum of 10,000 kokanee entered the SFBR to spawn in 1988.

## Fish Size

Hatchery rainbow trout sampled in the creel ranged from 203 to 356 mm, with an average size of 268 mm (Table 6). Wild rainbow trout averaged 328 mm, bull trout 318 mm, kokanee 284 mm, and mountain whitefish 332 mm.

## Angler Opinion Survey

Anglers on the SFBR were interviewed throughout 1988 for their opinions on the quality of fishing in the river. Over half (53%) of the 83 anglers interviewed reported that they fished less than five days on the SFBR during 1987 (Table 7). In comparison, the average Idaho stream angler fishing for trout spent 11.8 days fishing in 1987 (Reid 1989). Sixty percent of the anglers rated their present trip as good or excellent.

Table 2. Estimated number of fish caught and harvested in the South Fork Boise River between Featherville and Big Smokey Creek during May 28 to October 14, 1988. EB equals 80% error bounds.

Interval	Rainbow caught	Hatchery rainbow harvest	wild rainbow harvest	Bull trout		Mountain whitefish		Kokanee		Total fish		Catch (fish/hr)
				Caught	Harvest	Caught	Harvest	Caught	Harvest	Caught	Harvest	
5/28-6/10	278	207	14	14	14	36	0	0	0	328	235	0.43
EB	141	96	16	16	16	63	-	-	-	160	107	
6/11-6/14	1,448	260	37	74	74	0	0	0	0	1,522	371	1.64
EB	1,465	224	68	136	136	-	-	-	-	723	286	
6/25-7/8	1,189	1,025	55	0	0	41	41	0	0	1,230	1,121	0.85
EB	423	370	124	-	-	83	83	-	-	466	434	
7/9-7/22	772	479	0	0	0	0	0	0	0	772	479	0.97
EB	415	257	-	-	-	-	-	-	-	415	257	
7/23-8/5	1,411	727	599	0	0	0	0	0	0	1,411	1,326	1.50
EB	726	444	397	-	-	-	-	-	-	726	693	
8/6-8/19	774	669	0	35	0	70	35	0	0	880	704	0.83
EB	336	285		35	-	91	64	-	-	462	308	
8/20-9/2	710	609	51	0	0	0	0	0	0	710	660	0.58
EB	471	440	91	-	-	-	-	-	-	471	460	
9/3-9/16	321	289	0	13	13	12	0	0	0	347	302	0.54
EB	112	108	-	13	13	20	-	-	-	117	109	
9/17-9/30	237	123	0	0	0	0	0	0	0	237	123	1.72
EB	190	96	-	-	-	-	-	-	-	190	96	
10/1-10/14	202	121	51	11	7	18	11	81	66	312	257	1.24
EB	90	56	27	14	12	18	9	54	45	131	109	
Total	7,344	4,509	807	147	109	178	87	81	66	7,750	5,578	0.95
EB	1,354	870	432	143	139	109	105	54	45	1,357	1,080	

Table 3. Estimated number of fish caught and harvested in the South Fork Boise River between Featherville and Baumgartner Campground (Section 2) during May 28 to October 14, 1988. EB equals 80% error bounds.

Interval	Rainbow caught	Hatchery	Wild	Bull trout		Mountain whitefish		Kokanee		Total fish		Catch/rate (fish/hr)
		rainbo harvest	rainbow harvest	Caught	Harvest	Caught	Harvest	Caught	Harvest	Caught	Harves	
5/28-6/10	24	24	0	0	0	24	0	0	0	48	24	0.12
EB	48	48				99				109	48	
6/11-6/24	367	294	0	0	0	0	0	0	0	367	294	1.00
EB	280	151				-				280	151	
6/25-7/8	424	397	0	0	0	41	41	0	0	466	438	0.94
EB	289	276			-	81	81			347	337	
7/9-7/22	252	140	0	0	0	0	0	0	0	252	140	0.90
EB	125	62								125	62	
7/23-8/5	161	40	121	0	0	0	0	0	0	161	161	0.62
EB	179	115	171							179	179	
8/6-8/19	49	49	0	0	0	0	0	0	0	49	49	0.28
EB	30	30	-		-					30	30	
8/20-9/2	418	358	60	0	0	0	0	0	0	418	418	0.58
EB	474	444	111							469	474	
9/3-9/16	156	135	0	0	0	0	0	0	0	156	135	0.49
EB	83	75								83	75	
9/17-9/30	168	88	0	0	0	0	0	0	0	168	88	2.08
EB	150	75								150	75	
10/1-10/14	161	93	43	3	0	12	9	43	31	220	177	1.20
EB	81	49	25	8		16	8	38	25	105	85	
Total	2,181	1,618	224	3	0	77	50	43	31	2,305	1,923	0.71
EB	689	574	205	8		129	81	38	25	722	647	

Table 4. Estimated number of fish caught and harvested in the South Fork Boise River between Baumgartner Campground and Lightfoot Bar (Section 3) during May 28 to October 14, 1988. EB equals 80% error bounds.

Interval	Rainbow caught	Hatchery rainbow harvest	Wild rainbow harvest	Bull trout		Mountain whitefish		Kokanee		Total fish		Catch/rate (fish/hr)
				Caught	Harvest	Caught	Harvest	Caught	Harvest	Caught	Harvest	
5/28-6/10 EB	93 74	76 66	17 18	17 18	17 18	34 62	0	0	0	143 103	110 80	0.65
6/11-6/24 EB	179 182	134 183	45 75	90 151	90 151	0	0	0	0	269 259	269 259	0.66
6/25-7/8 EB	353 174	286 143	10 10	0	0	0	0	0	0	353 174	295 143	0.92
7/9-7/22 EB	126 212	72 104	0	0	0	0	0	0	0	126 212	72 104	0.54
7/23-8/5 EB	679 631	339 388	204 277	0	0	0	0	0	0	679 631	543 528	1.67
8/6-8/19 EB	421 234	395 210	0	26 26	0	0	0	0	0	447 250	395 210	0.89
8/20-9/2 EB	112 126	84 114	0	0	0	0	0	0	0	112 126	84 114	0.50
9/3-9/16 EB	100 59	93 58	0	0	0	14 21	0	0	0	114 64	93 58	0.64
9/17-9/30 EB	0	0	0	0	0	0	0	0	0	0	0	0.00
10/1-10/14 EB	7 8	7 8	0	15 21	15 21	7 8	0	59 64	59 64	88 95	81 89	1.60
Total EB	2,070 766	1,487 530	275 288	148 256	121 153	55 66	0	59 64	59 64	2,332 802	1,942 672	0.89

Table 5. Estimated number of fish caught and harvested in the South Fork Boise River between Lightfoot Bar and Big Smokey Creek (Section 4) during May 28 to October 14, 1988. EB equals 80% error bounds.

Interval	Rainbow caught	Hatchery rainbow harvest	wild rainbow harvest	Bull trout		Mountain whitefish		kokanee		Total fish		
		Caught	Harves	Caught	Harvest	Caught	Harvest	Caught	Harvest	Catch/rate (fish/hr)		
5/28-6/10 EB	67 54	47 32	0 -	0 -	0 -	0 -	0 -	0 -	0 -	67 54	47 32	0.42
6/11-6/24 EB	431 288	0 -	0 -	0 -	0 -	0 -	0 -	0 -	0 -	431 288	0 -	2.72
6/25-7/8 EB	364 223	306 162	57 172	0 -	0 -	0 -	0 -	0 -	0 -	364 223	364 223	0.63
7/9-7/22 EB	528 240	366 190	0 -	0 -	0 -	0 -	0 -	0 -	0 -	528 240	366 189	1.86
7/23-8/5 EB	543 327	314 197	229 195	0 -	0 -	0 -	0 -	0 -	0 -	543 327	543 327	2.00
8/6-8/19 EB	383 512	192 256	0 -	0 -	0 -	192 181	96 128	0 -	0 -	575 769	287 385	1.50
8/20-9/2 EB	208 116	208 116	0 -	0 -	0 -	0 -	0 -	0 -	0 -	208 116	208 116	0.75
9/3-9/16 EB	68 45	63 44	0 -	10 9	10 9	0 -	0 -	0 -	0 -	77 45	72 44	0.53
9/17-9/30 EB	0 -	0 -	0 -	0 -	0 -	0 -	0 -	0 -	0 -	0 -	0 -	0.00
10/1-10/14 EB	13 13	13 13	0 -	0 -	0 -	0 -	0 -	0 -	0 -	13 13	13 13	1.00
Total EB	2,606 761	1,509 428	286 260	10 9	10 9	192 181	96 128	0 -	0 -	2,807 953	1,901 598	1.21

Table 6. Length frequency of fish sampled in anglers' creel on the South Fork Boise River, 1988.

Total length (mm)	Rainbow trout		Bull trout	Kokane	Mountain whitefish
	Hatchery	Wild			
200-204	2				
205-209					
210-214	2				
215-219					
220-224					
225-229	2				
230-234	3				
235-239	3				
240-244					
245-249	2				
250-254	6				
255-259	12				
260-264	5			2	
265-269	2				
270-274	3				
275-279	4			1	
280-284	11			1	
285-289	4			1	
290-294	4	1		4	
295-299				1	
300-304	7		1	1	
305-309			1		
310-314			1		1
315-319					
320-324	1		1		
325-329					
330-334	1	1	2		
335-339					
340-344					1
345-349					1
350-354					
355-359	1				
360-364		1			
Total	75	3	6	11	3
Mean length	267.7	328.5	317.5	283.6	331.7

Table 7. Responses (percent) of 83 anglers to the South Fork Boise River opinion questionnaire in 1988.

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How many days did you fish the South Fork Boise River above Anderson Ranch Reservoir last year?

Days	Section 2	Section 3	Section 4	Combined
<5	51.8	54.6	52.2	53.0
5-10	25.9	18.2	26.1	22.9
>10	22.2	15.2	13.0	16.9
NR <sup>a</sup>	0	12.1	8.7	7.2

How would you rate this fishing trip?

	Section 2	Section 3	Section 4	Combined
Excellent	18.5	12.1	8.7	13.2
Good	55.6	42.4	43.5	47.0
Fair	7.4	24.2	30.4	20.5
Poor	18.5	21.2	17.4	19.3

What species of fish are you fishing for? 89 responses

	Section 2	Section 3	Section 4	Combined
Rainbow	64.3	72.2	64.0	67.4
Bull trout	3.6	8.3	8.0	6.7
Whitefish	0	0	0	0
Kokanee	3.6	0	0	1.1
Any fish	28.6	19.4	28.0	24.7

What species of fish do you prefer to catch?

	Section 2	Section 3	Section 4	Combined
Rainbow	85.2	87.9	73.9	83.1
Bull trout	7.4	3.0	8.7	6.0
Whitefish	0	0	0	0
Kokanee	3.7	0	0	1.2
Any fish	3.7	9.1	17.4	9.6

Are you satisfied with the size of trout?

	Section 2	Section 3	Section 4	Combined
Yes	85.2	63.6	65.2	71.1
No	11.1	36.4	30.4	26.5
NR	3.7	0	4.4	2.4



Table 7. (Continued)

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Are you satisfied with the abundance of trout?

	Section 2	Section 3	Section 4	Combined
Yes	81.5	72.7	73.9	75.9
No	18.5	27.3	26.1	24.1

Would you be in favor of restrictive regulations on the South Fork Boise River above Anderson Ranch Reservoir if these regulations increased the size <sup>a</sup> and abundance of wild trout, even though many of the fish caught might have to be released?

	Section 2	Section 3	Section 4	Combined
Yes	55.6	45.4	69.6	55.4
No	44.4	54.6	23.1	43.4
Maybe	0	0	4.4	1.2

Do you support the stocking of hatchery rainbow trout in some sections of the South Fork Boise River above Anderson Ranch Reservoir?

	Section 2	Section 3	Section 4	Combined
Yes	96.3	100.0	95.6	97.6
No	3.7	0	4.4	2.4

---

<sup>a</sup>NR = No Response.

Over 90% of the anglers fishing the SFBR were fishing for, and preferred catching, rainbow trout or any fish. Eight percent of the anglers in Sections 3 and 4 were fishing for bull trout.

Over 70% of the anglers were satisfied with the size and abundance of trout in the SFBR. More anglers (>80%) in Section 2 were satisfied with the quality of the trout than anglers in the upper sections even though the catch rates were lower in Section 2. Fishing in Section 2 was predominantly done in and near major campgrounds.

Slightly over half (55%) of the anglers interviewed on the SFBR and statewide favored some restrictive regulations if the size and abundance of wild trout would increase. Almost all (982) anglers on the SFBR supported the stocking of hatchery rainbow trout on some portions of the river.

### Lime Creek drainage

Lime Creek is in Elmore and Camas counties on the south and west end of the Soldier Mountains. It is the only major drainage that flows into Anderson Ranch Reservoir from the southeast. The headwaters of the drainage lie in forested lands, while the lower portion flows through a deep, narrow, inaccessible canyon with predominately sagebrush vegetation. Due to the current unroaded status of most of the drainage, the U.S. Forest Service has had relatively few logging sales in the drainage but they are considering expanding their activities.

Fish populations were sampled near access points in Lime Creek and the South Fork Lime Creek during July 1988 by electrofishing (Figure 3). Basic habitat data were also collected (Table 8). A total of 109 wild rainbow trout, 1 hatchery rainbow trout, 11 mountain whitefish, 26 sculpin, 3 suckers, and 6 yellow perch Perca flavescens were sampled in the two lower sites near the mouth of Lime Creek (Sec16,T1N,R10E). Population densities were estimated at 5.1 and 6.4/100 m<sup>2</sup> (Table 8). In site 3 (Sec4,T1N,R11E), below the confluence of the South and North forks, 38 wild rainbow trout and 6 sculpin were sampled with an estimated density of 6.3 rainbow/100 m<sup>2</sup>. In two sites on the South Fork Lime Creek (Sec3,T1N,R11E), 51 wild rainbow trout and 11 suckers were collected resulting in population estimates of 7.6 and 4.7 rainbow/100 m<sup>2</sup>. Migrating species not sampled include kokanee from Anderson Ranch Reservoir, which spawn in Lime Creek in August and September.

Wild rainbow trout in the lower two sections of Lime Creek ranged from 96 to 245 mm in length, with an average size of 153 mm. Based on length frequency, at least two year-classes were present. Wild rainbow trout in the upper section of Lime Creek and in the South Fork Lime Creek ranged from 33 to 256 mm, with an average size of 122 mm (Figure 4). Young-of-the-year (YOY) rainbow trout were found only in the upper sample sites where they accounted for 122 of the sample (Figure 5). These sites were sampled two weeks later than the lower sites, allowing more fry to emerge from the gravel.

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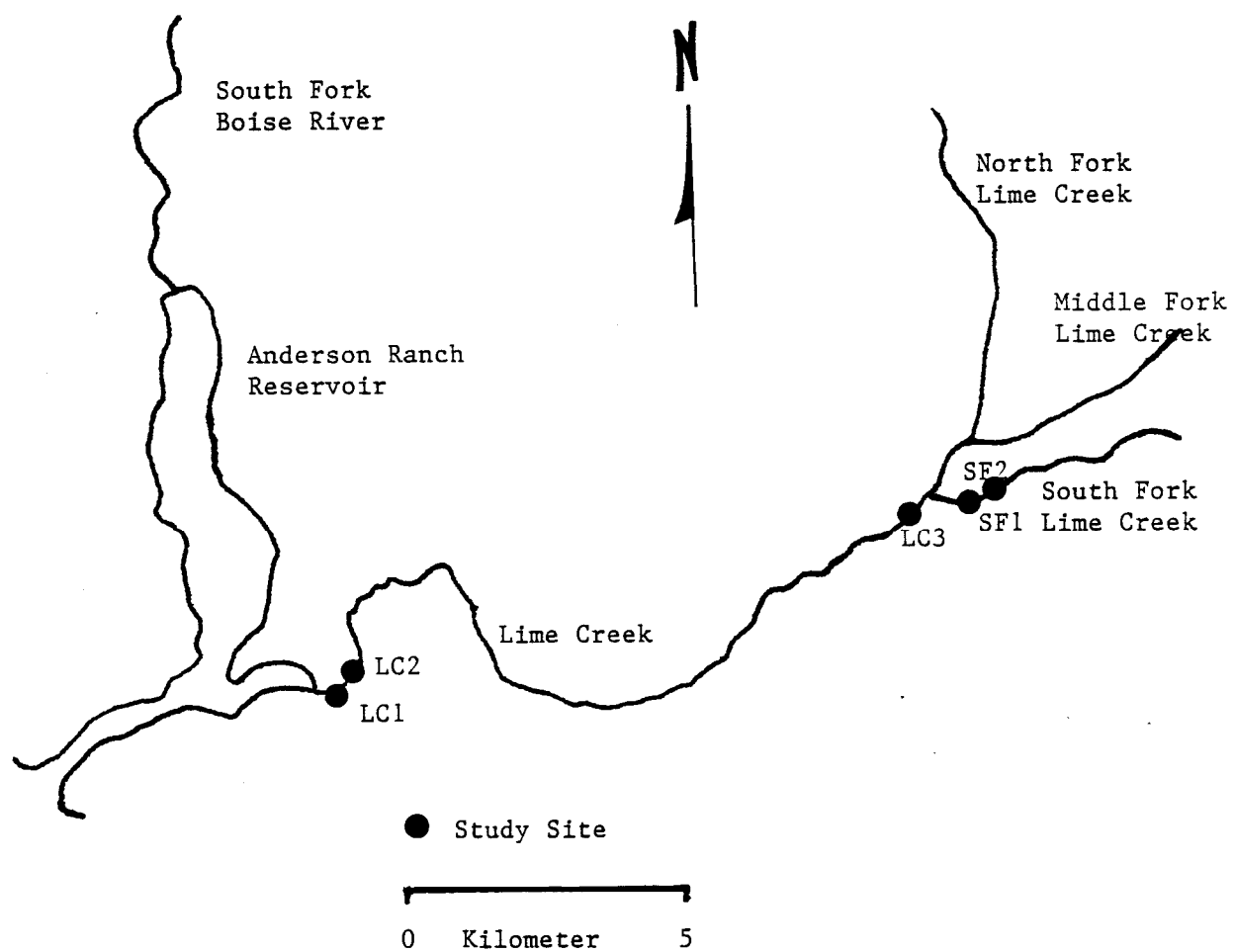


Figure 3. Location of stream survey sites in the Lime Creek drainage, Idaho during 1988.

Table 8. Habitat and fish population data collected in the Lime Creek drainage during 1988.

	Lime Creek			South Fork	Lime Creek
	Section 1	Section 2	Section 3	Section 1	Section 2
Date surveyed	7-13-88	7-14-88	7-26-88	7-27-88	7-27-88
Channel type	Confined	Confined	Confined	Confined	Confined
Gradient (%)	3.0	4.0	4.0	4.0	2.5
Mean width (m)	10.2	10.1	7.3	5.2	4.7
Mean depth (m)	0.24	0.21	0.22	0.13	0.11
Habitat (X)					
Pool	26.7	3.7	17.9	3.4	0
Run	26.7	33.3	10.7	10.3	14.3
Pocket water	20.0	33.3	14.3	20.7	7.1
Riffle	26.7	29.6	57.1	65.5	78.6
Substrate class (%)					
Organic	0	0	0.8	0	3.3
Silt	1.2	0	6.7	6.0	5.3
Sand	22.8	21.2	13.6	14.0	12.0
Gravel	14.8	9.2	19.3	23.5	24.7
Rubble	32.7	29.8	38.7	40.5	41.7
Boulder	28.5	33.2	21.0	16.0	9.7
Bedrock	0	6.7	0	0	3.3
Water chemistry					
Temperature(c)		20	19	16	16
Alkalinity(mg/l)		80	-	-	62
Hardness(mg/l)		75	-	-	55
Fish Population					
Rainbow/100m <sup>2</sup>	5.11	6.41	6.33	7.63	4.72
Rainbow/100m	52.11	64.78	46.21	39.70	22.17
Mtn. whitefish	Present	Present			
Sculpin sp	Present	Present	Present		
Sucker sp		Present		Present	Present
Yellow perch	Present	Present			

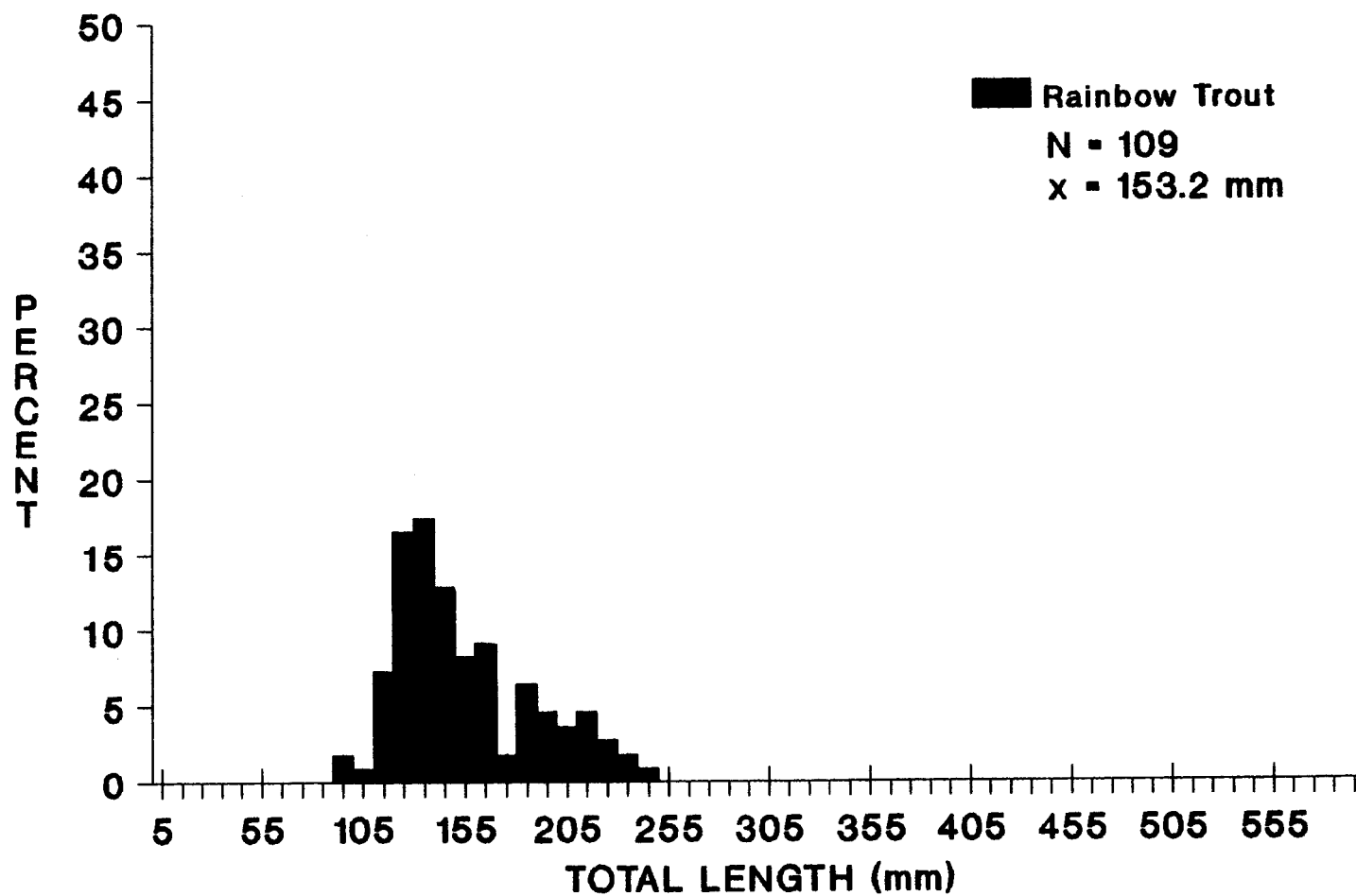


Figure 4. Length frequency of rainbow trout sampled in lower Lime Creek (Sites 1 and 2) on July 13 and 14, 1988.

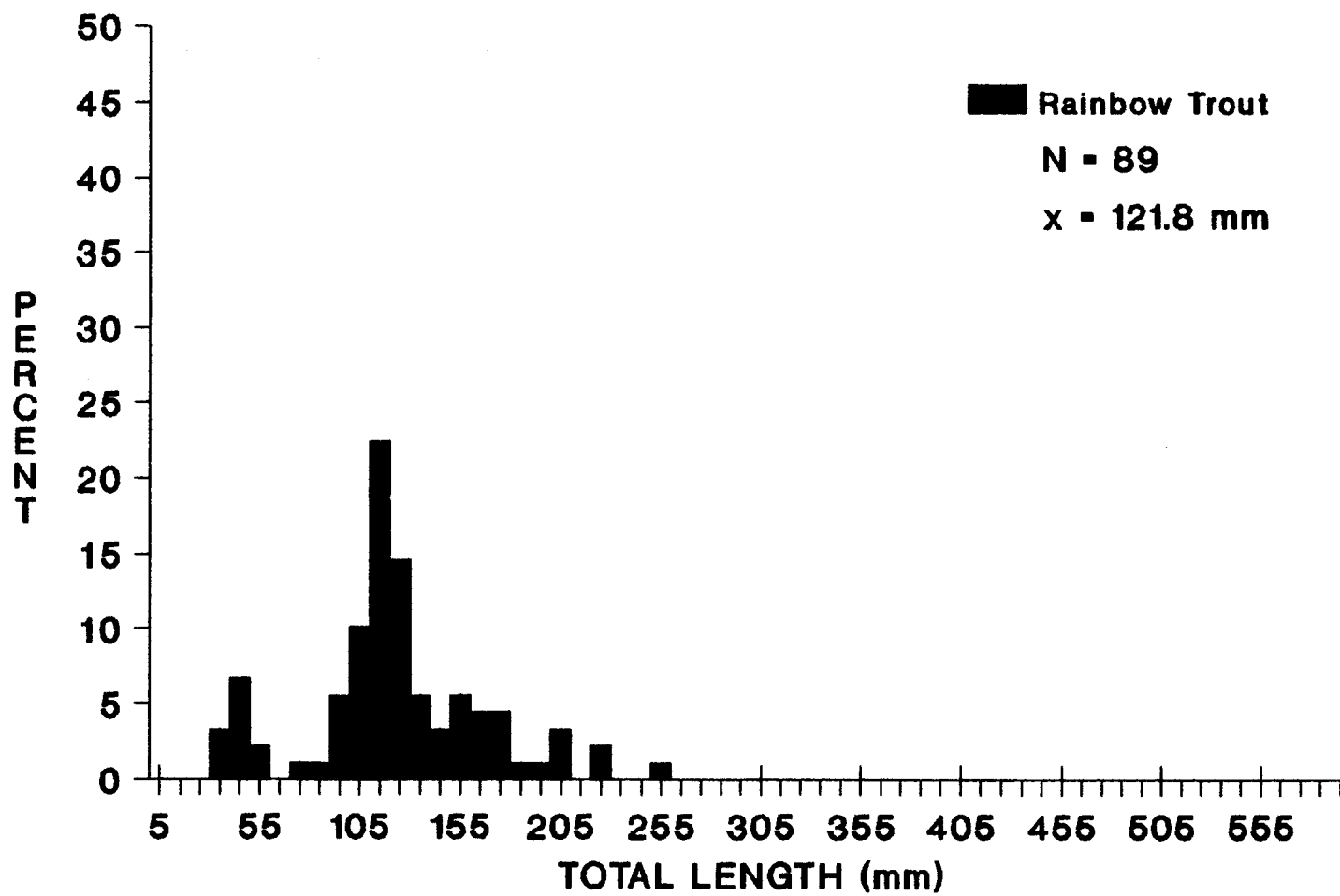


Figure 5. Length frequency of rainbow trout sampled in upper Lime Creek and South Fork Lime Creek on July 26 and 27, 1988.

### Willow Creek

An agreement was made with Marshall Ashcraft to monitor stream habitat changes on his property in Willow Creek, Camas County, as a result of his reducing livestock grazing by fencing the riparian area. Additionally, 10,000 brown trout Salmo trutta fingerlings (268/kg) were released throughout the upper Willow Creek area on May 12, 1988.

Two monitoring sites in Sec36,T2N,R15E were established for photo points in June 1988, and fish populations were sampled in the lower site in July and November 1988. July electrofishing collected 238 fish in the 198 m of stream sampled. Wild rainbow trout accounted for 63%, brown trout 34%, and sculpin sp. 3%. Population density estimates for rainbow and brown trout were 22.7 and 15.4 fish/100 m<sup>2</sup>, respectively (Table 9).

An inspection of Willow Creek on August 23, 1988, found that drought conditions had caused the stream to become intermittent, leaving only a few small pools in the sample reach. During the fall, flows resumed in Willow Creek, and the reach was electrofished on November 10, 1988, to see if fish survived. A total of 74 fish were sampled with rainbow trout accounting for 76%, brown trout 15%, and sculpin sp. 9%. Density estimates were 9.2 and 1.8 fish/100 m<sup>2</sup> for rainbow and brown trout, a 71% decrease in trout population densities from July levels.

Rainbow trout sampled in Willow Creek during July ranged from 65 to 207 mm with a mean size of 104 mm (Figure 6). During November they ranged from 70 to 155 mm, mean size of 109 mm. The brown trout which were released in May averaged 87mm in July and 111 mm in November.

### Box Canyon Creek

Rainbow trout were sampled in Box Canyon in Sec28,T8S,R14E on May 6, 1988, to check for spawning fish below the Clear Springs Hatchery Diversion. Due to stream size and velocity, electrofishing samples were only taken along the sides of the stream. Approximately 50 m along both sides from the diversion downstream and 50 m along the south bank near the mouth were sampled. Three spawning fish were caught along with 63 other wild rainbow trout below the diversion. The two spent females were 185 and 190 mm long and the ripe male, 235 mm. Five wild rainbow trout were sampled near the mouth. The wild rainbow trout sampled in both areas ranged from 33 to 292 mm with a mean length of 157.0 mm (Figure 7).

On November 3, 1988, the area below the diversion was sampled again. A total of 78 wild and 3 hatchery rainbow trout were collected, along with 7 sculpin sp., 2 dace sp., and 2 crayfish Pacifasticus gambeli. Two additional trout similar to the 445 mm hatchery trout were lost in the fast current. Two of the hatchery fish sampled were ripe and actively spawning. The hatchery rainbow trout ranged from 280 to 445 mm with an

Table 9. Fish population estimates from Willow Creek<sup>a</sup>, Camas County, Idaho in 1988.

Date/ Species	Number sampled	Population estimate	Density	
			Per 100 m <sup>2</sup>	Per 100 m
7/8/88				
Rainbow trout	149	159	22.7	80.2
Brown trout	81	108	15.4	54.5
Sculpin sp	8		--	--
8/23/88		Stream dry with intermittent pools.		
11/10/88				
Rainbow trout	56	65	9.2	32.6
Brown trout	11	13	1.8	6.4
Sculpin sp.	7		--	--

<sup>a</sup>Sample site 198 m long, mean width 3.53 m.



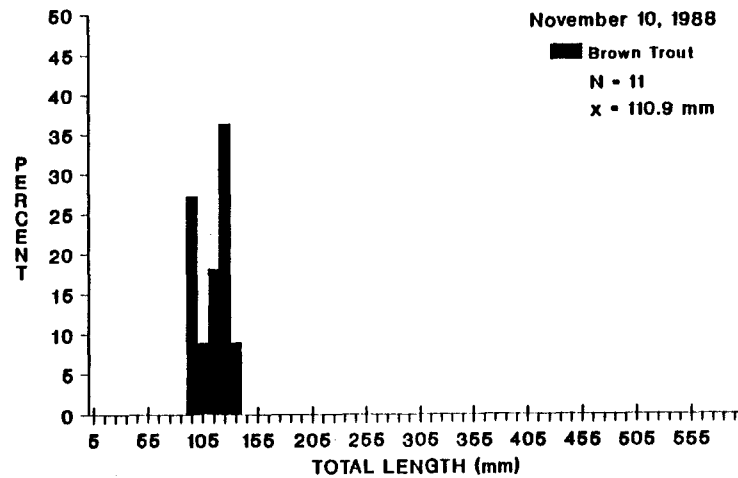
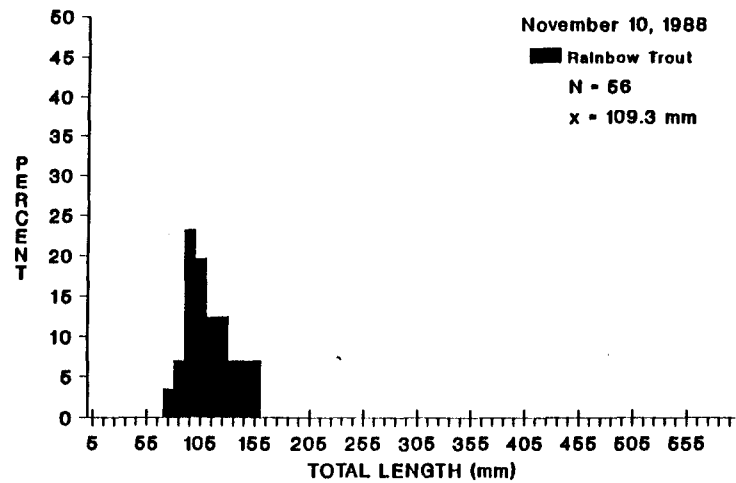
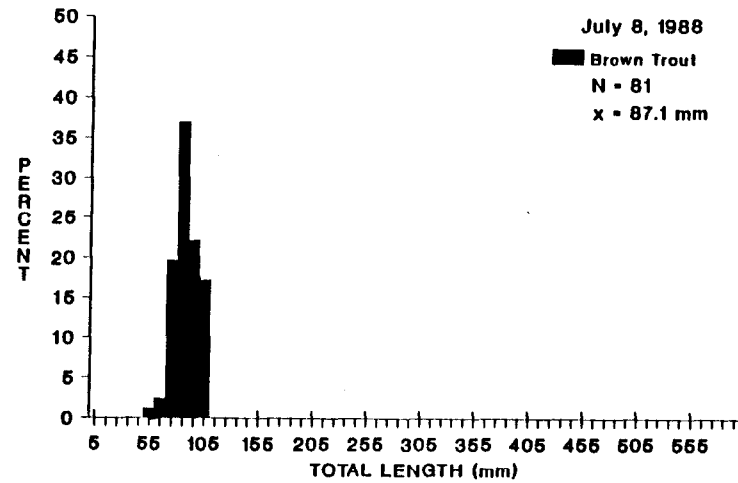
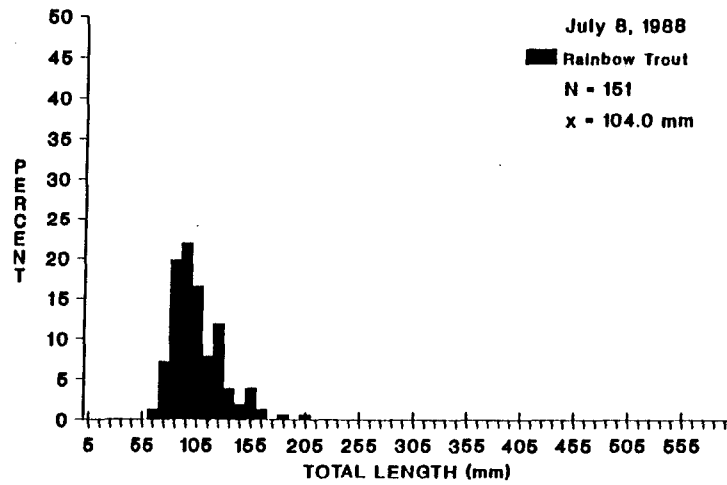


Figure 6. Length frequency of rainbow trout and brown trout sampled in Willow Creek in July and November, 1988.

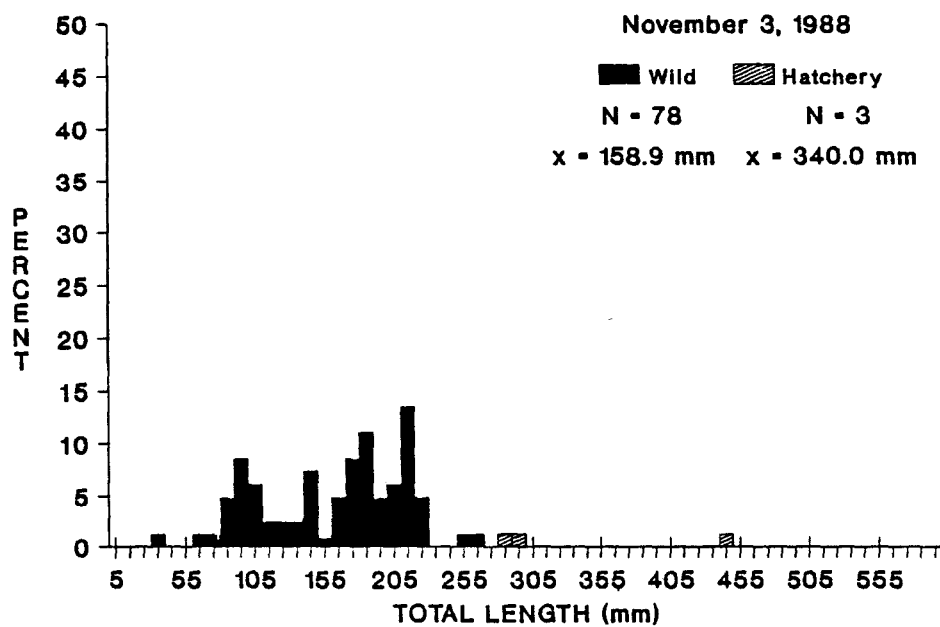
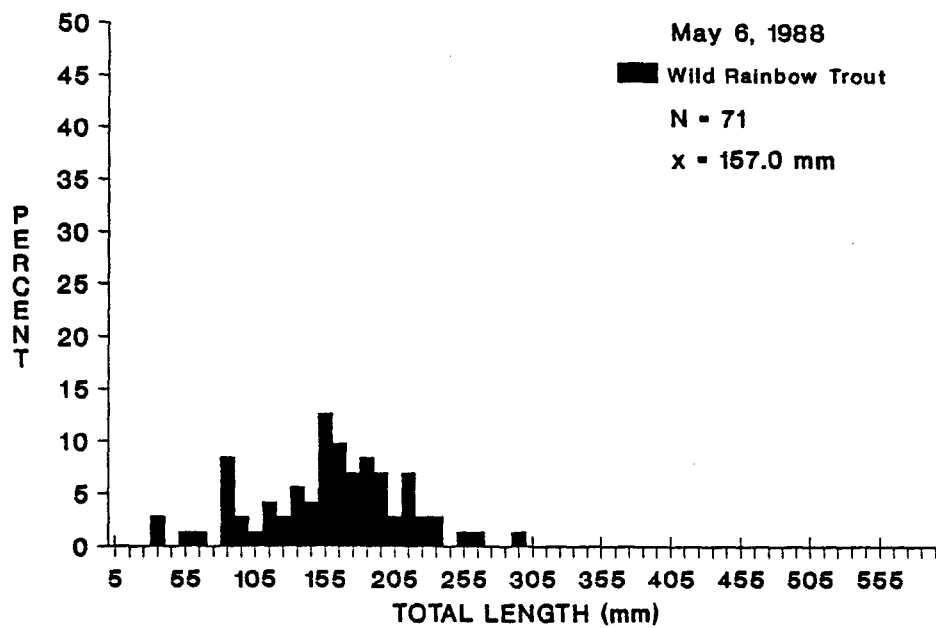


Figure 7. Length frequency of rainbow trout sampled in Box Canyon Creek in May and November, 1988.

average of 340 mm, and the wild rainbow trout ranged from 35 to 260 mm with an average of 158.9 mm (Figure 7). The presence of both spawning wild trout in the spring and hatchery trout in the fall, along with juvenile trout, show that Box Canyon Creek is used both by resident and migratory rainbow trout populations up to the Clear Springs Hatchery Diversion.

Snorkeling observations were made in Box Canyon Creek from the Clear Springs Hatchery Diversion up to the falls on July 15, 1988. Two divers observed 75 rainbow trout along the south bank between the U.S. Geological Survey (USGS) gauge station and the falls. Fish were generally in the 75 to 150 mm range. Additional counts were: 22 rainbow trout from the gauge station down to the first rapid; 51 rainbow trout and 1 sculpin in the run from the USGS cable crossing up to the rapid; 140 rainbow trout from the diversion pool up to the first rapid; and 75 rainbow trout and 6 sculpin in the diversion pond. All observations were made along the south bank of the stream.

### Eightmile Creek

Three sections of Eightmile Creek (Sec3,T15S,R28E) were electrofished on July 11, 1988, to evaluate the status of the cutthroat trout population. A two-pass population estimate was made on 142 m of stream at the site described by Grunder et al. (1987). Additional sampling included single pass collections below and above the first road crossing.

A total of 85 wild cutthroat trout were captured at the three sites. No other species were sampled. The population estimate for the upstream site (1986 sample reach) was  $28(\pm 0)$ , or 19.8 fish/100 m. In 1986, only 82 m of stream were sampled at this site, yielding an estimate of 5.1 fish/100 m (Grunder et al. 1987). Lengths of cutthroat trout at this site ranged from 92 to 256 mm. For all sites combined, lengths ranged from 31 to 272 mm with a mean of 127.1 mm (Figure 8).

The difference in densities at the upper site from 1986 to 1988 may reflect different sampling times. The 1986 sample was taken during early August. Other causes may have also affected the disparity.

### Dry Creek

A 61.9 m (mean width 2.6 m) section of Dry Creek (Sec13,T2S,R19E) was electrofished on July 19, 1988, to assess species composition and abundance. Observations were also made on water quality parameters and habitat features.

An estimated  $13(\pm 0)$  age-1+ and older trout were present, for a calculated density of 8.1/100 m<sup>2</sup>. One fry (34 mm) was also captured. Excluding the fry, "fish lengths ranged from 98 to 174 mm (Figure 9). All of the trout were classified as cutthroat x rainbow trout hybrids due to heavy spotting. Parr marks were evident on all fish. Other fish sampled were sculpin sp.

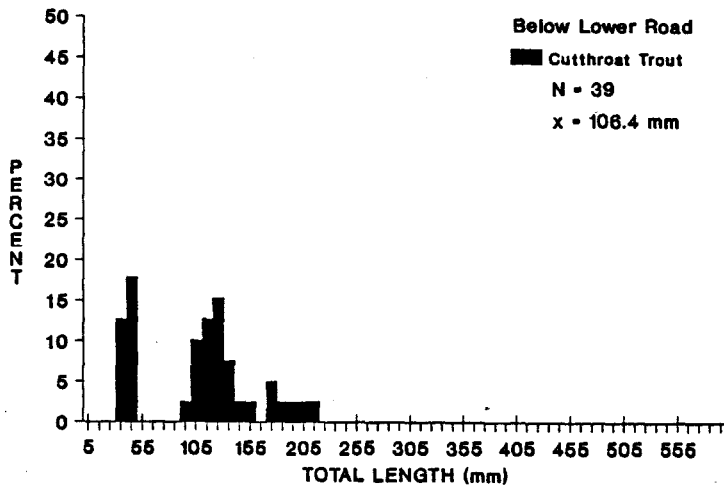
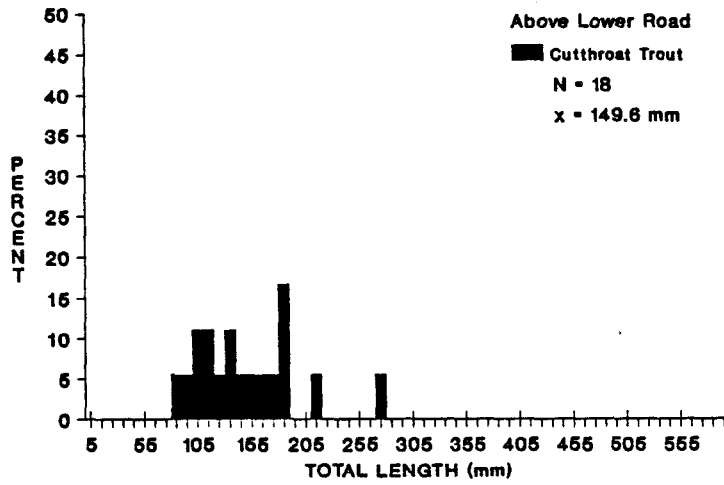
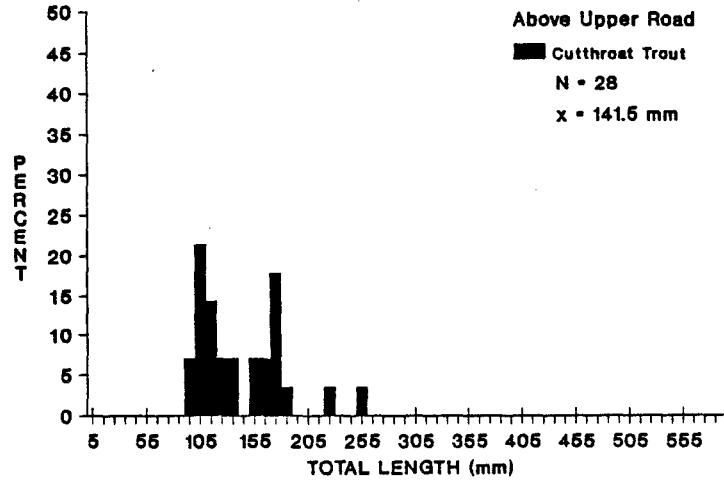


Figure 8. Length frequency of cutthroat trout sampled in Eightmile Creek on July 11, 1988.

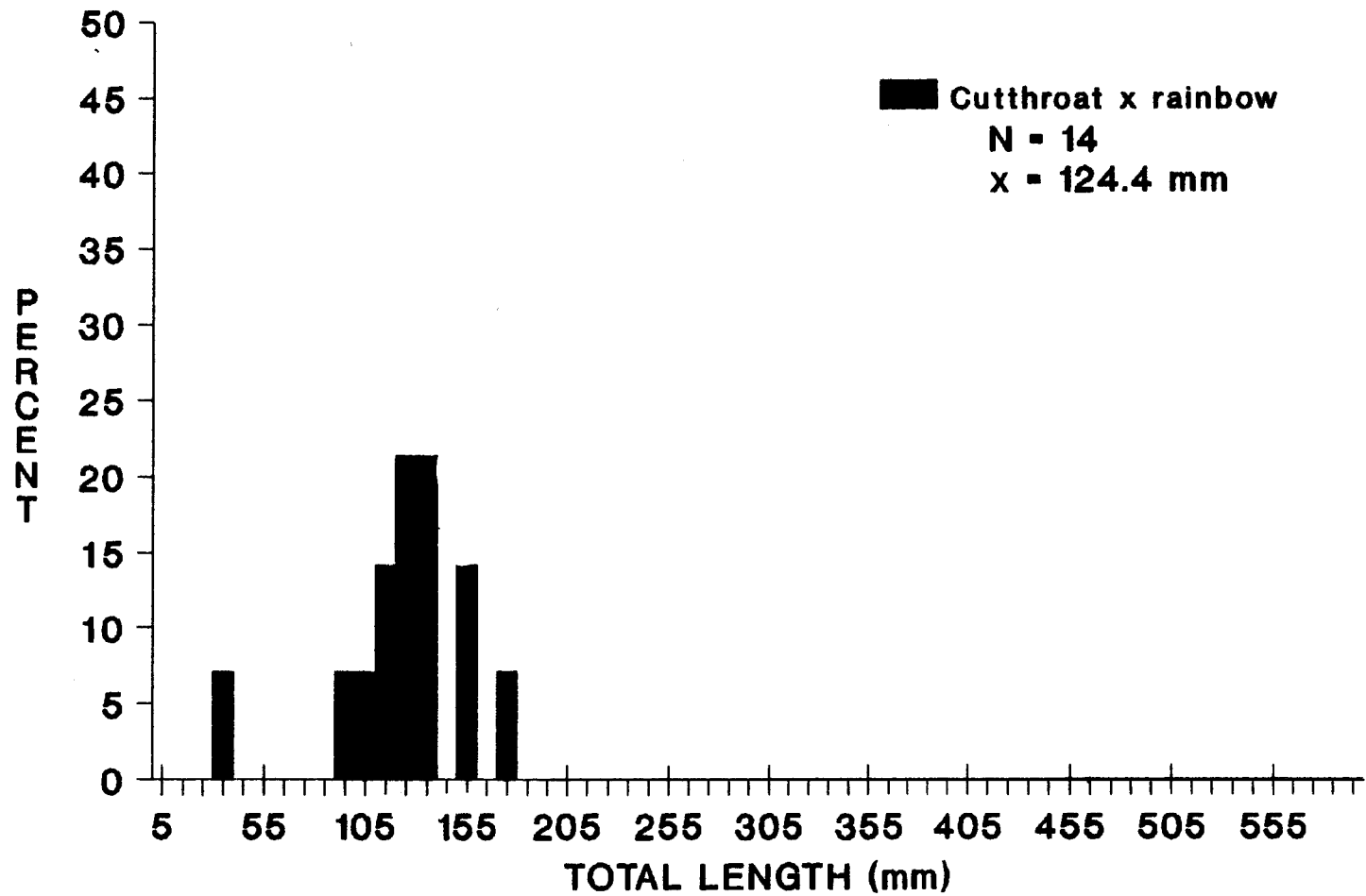


Figure 9. Length frequency of cutthroat x rainbow trout hybrids sampled in Dry Creek on July 19, 1988.

Water quality parameters measured were: temperature - 14°C, dissolved oxygen - 9.1 mg/l, alkalinity - 60 mg/l, and hardness - 45 mg/l. Natural debris jams at both ends of the section were considered to be fish migration barriers. Vegetation associated with the stream includes cottonwood, cedar, willow, and sagebrush.

#### **Elkhorn Gulch**

In order to comment on a proposed bike path, fish were sampled from Elkhorn Gulch (Twin Creek) (Sec20,T4N,R18E) on July 29, 1988. Five areas (240 m total) from the Elkhorn Golf Course were electrofished to assess fish presence and species composition.

Brook trout and wild rainbow trout were found at all sites. Brook trout (N=26) ranged from 68 to 196 mm, with a mean length of 106 mm (Figure 10). Rainbow trout (N=28) ranged from 35 to 190 mm with a mean of 76 mm. Based on length frequency, two or three age-classes were present (Figure 10).

Presently, the dam creating the small pond downstream from the housing area is a migration block. Consideration should be given to developing fish passage at this site to allow fish migration from the Big Wood River.

#### **West Fork Trail Creek**

On June 10, 1988, 17 brook trout and 4 wild rainbow trout were collected by electrofishing 30 m of the West Fork Trail Creek. Area sampled was the same as in 1987 in Sec22,T6N,R18E. Brook trout ranged from 72 to 380 mm, with a mean size of 140 mm (Figure 11). Grunder et al. (1989) found that over half the brook trout sampled in 1987 were over 150 mm, while in 1988 only 29% were of this size. Rainbow trout were 87, 110, 140, and 210 mm in length.

#### **East Fork Big Wood River**

On June 2, 1988, the East Fork Big Wood River was electrofished above and below the diverted reach at the Walden-Sheriden subdivision. Above the diversion, 21 wild rainbow trout, 1 brook trout (301 mm), and 2 sculpin sp. were collected. At the lower end of the diverted reach, 31 wild rainbow trout, 1 brook trout (200 mm), and 11 sculpin sp. were sampled. Rainbow trout at the upper site ranged from 48 to 302 mm and at the lower site, 52 to 176 mm (Figure 12).

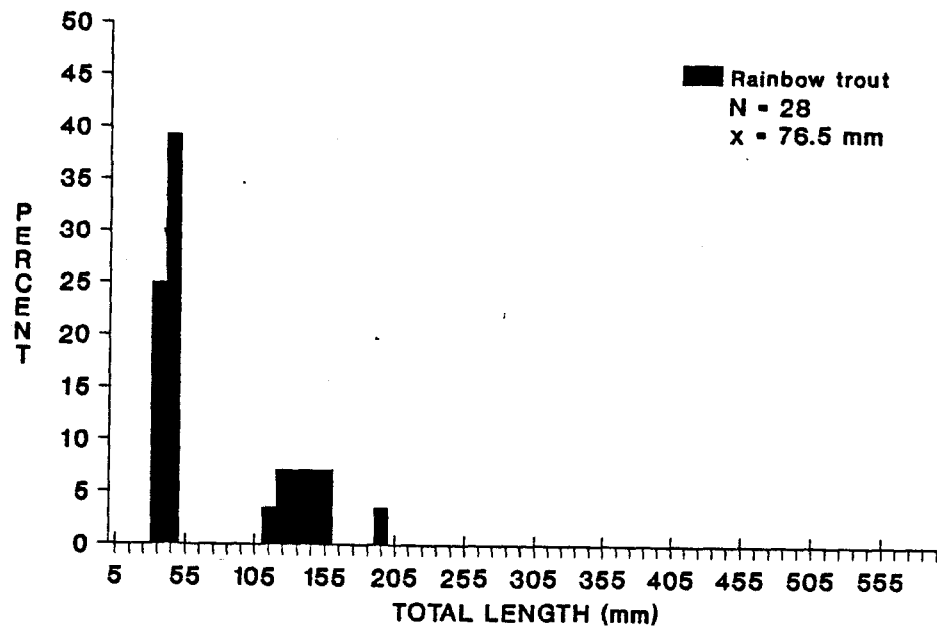
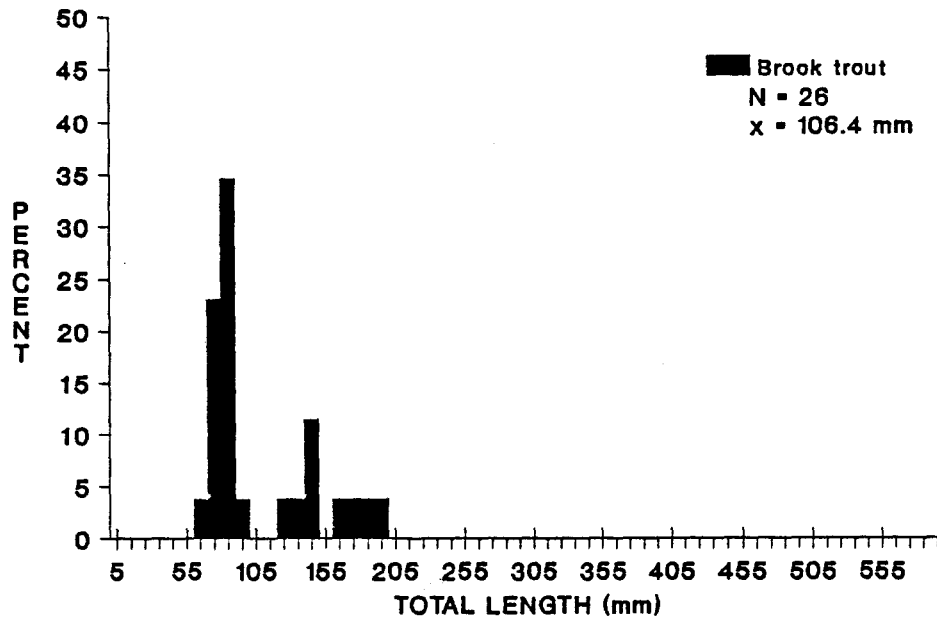


Figure 10. Length frequency of brook trout and rainbow trout sampled in Elkhorn Gulch (Twin Creek) on July 29, 1988.

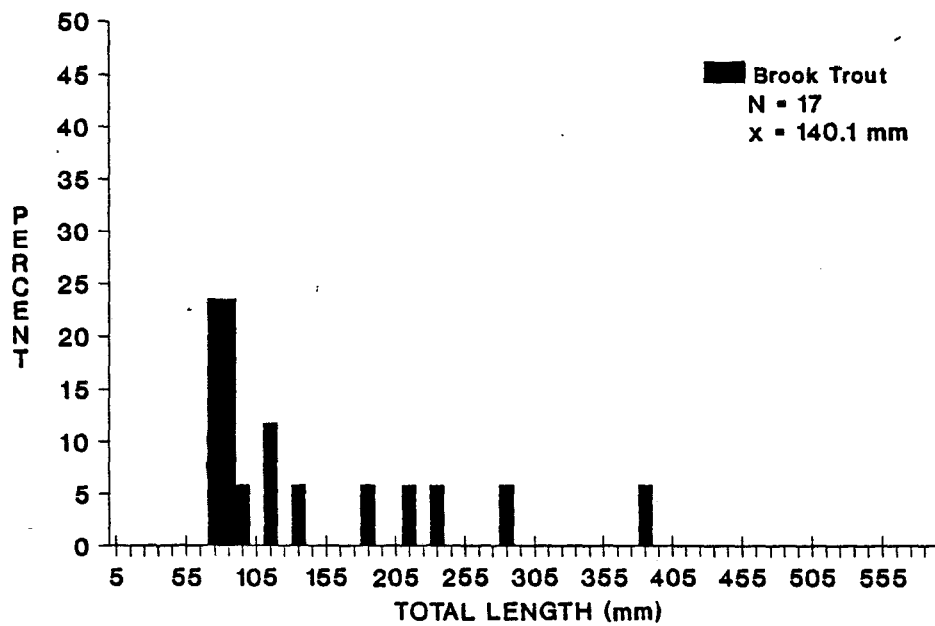
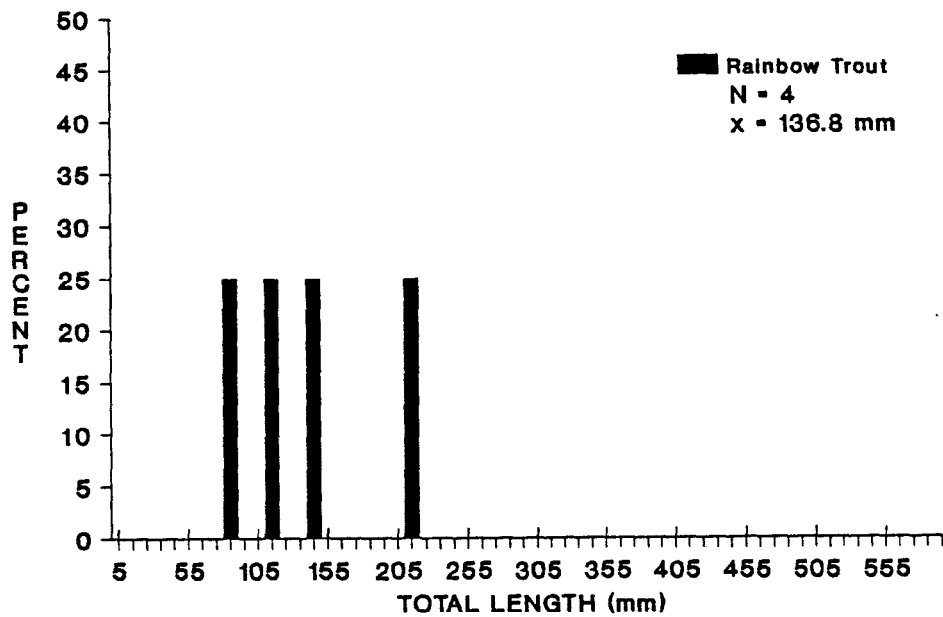


Figure 11. Length frequency of brook trout and rainbow trout sampled in the West Fork Trail Creek on June 10, 1988.



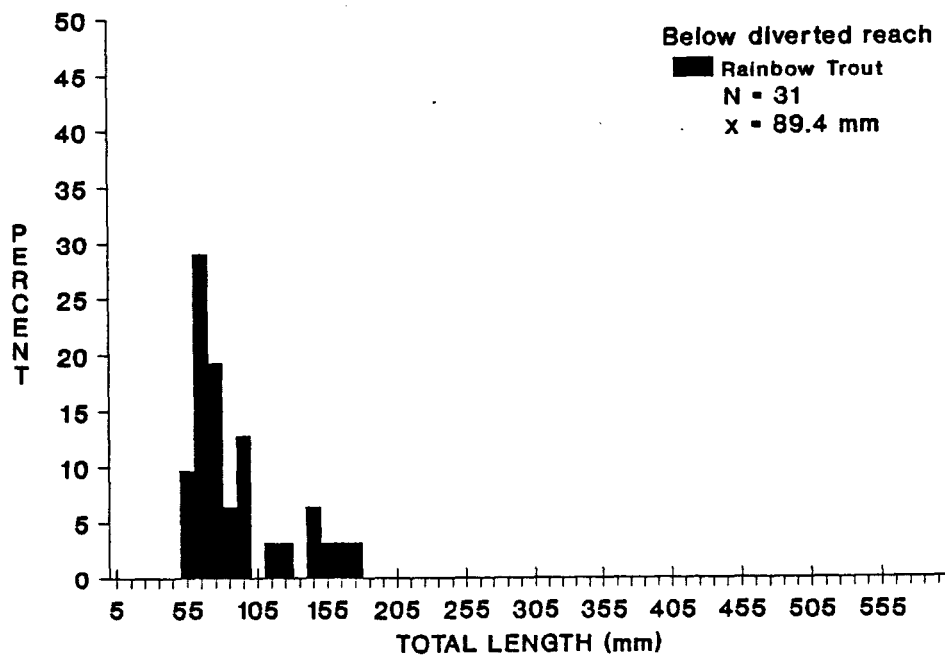
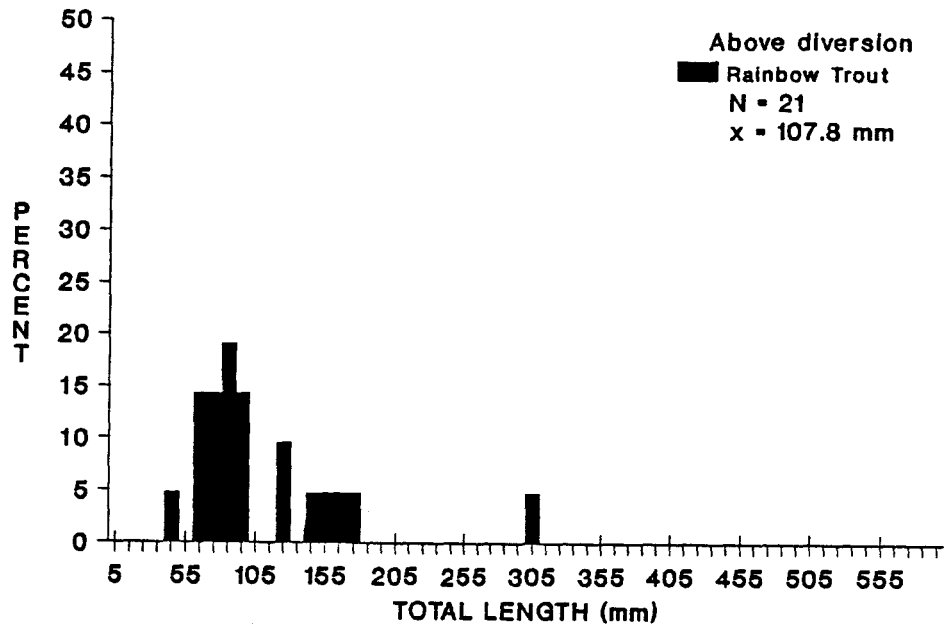


Figure 12. Length frequency of rainbow trout sampled in the East Fork Big Wood River on June 2, 1988.

### **Shoshone and Hot creeks**

On October 7, 1988, sites in Shoshone and Hot creeks in Sections 22 and 27, T16S, R17E were electrofished to determine summer survival of stocked brown trout and to document fish populations in a Bureau of Land Management livestock exclosure. In a 200 m section of Hot Creek (started 70 m above mouth), five hatchery brown trout were sampled, along with numerous redbreasted sunfish, dace sp., and sucker sp. The brown trout ranged from 175 to 260 mm, mean 204 mm.

In Shoshone Creek, only one brown trout (460 mm, 1,150 g) and one rainbow trout (340 mm) were collected in 200 m of stream located at the upper end of the exclosure below Hot Creek. Additional sampling in pools at the lower end and below the exclosure (approximately 300 m of stream total) resulted in one brown trout (325 mm) and three rainbow trout (320, 380, and 470 mm). Water levels and apparent fish numbers in Shoshone Creek were the lowest seen in the last 20 years.

### **ACKNOWLEDGMENTS**

Field work in 1988 was planned and supervised by Scott Grunder (Regional Fishery Biologist). Biological aides Steve Elam, Ray Garrison, and Joy Eiman assisted with the collection of field data. Steve Elam assisted with data summarization and analysis.

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## JOB PERFORMANCE REPORT

State of: Idaho

Name: Regional Fishery Management  
Investigations

Project No: F-71-R-13

Title: Region 4 Technical Guidance

Job No.: 4-d

Period Covered: July 1, 1988 to June 30, 1989

### ABSTRACT

Region 4 fishery management personnel provided technical guidance to state and federal agencies and private individuals. Comments on 154 documents were included in this guidance work.

An estimated 90 man-days were spent in corresponding, reviewing, attending meetings, and making field inspections of proposed and existing hydropower projects. Forty-one cogeneration-type hydro plants were in operation in Region 4 by the spring of 1989. This makes up approximately 802 of the 51 cogeneration facilities in the state selling power to Idaho Power Company. Maximum power production of these plants is approximately 58.7 mw, or roughly 192 of the hydropower production in Region 4. The four largest cogeneration hydros in the region are utilizing irrigation canal water and generate about 512 of the power produced by the cogeneration facilities.

Many miscellaneous activities were commented on or participated in, and numerous meetings regarding fisheries and wildlife were attended.

#### Authors:

Robert J. Bell,  
Regional Fishery Manager

Fred E. Partridge  
Regional Fishery Biologist

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## OBJECTIVES

1. To furnish technical assistance, advice, and comments to other agencies, organizations, or individuals regarding any items, projects, or activities associated with, or that may have an impact on, the fishery resource or aquatic habitat of the Region.
2. To comment upon environmental impact statements, environmental analysis reports, discharge permits, and proposed or existing hydropower projects or similar items. To participate in the Department of Fish and Game's fish and wildlife resource planning.

## RECOMMENDATION

Technical guidance and assistance related to the fishery resource of Region 4 should be continued on an annual basis.

## TECHNIQUES USED

Reviews, field inspections where necessary, comments, expertise, advice, and recommendations were furnished upon request to all governmental and private organizations and individuals. Numerous meetings and hearings were attended, and prescriptions were given when requested or necessary.

## FINDINGS

Fishery management personnel in Region 4 responded to the following written requests for comments from various agencies and individuals:

Department of Water Resources	62
Environmental Protection Agency	10
Bureau of Land Management	12
U.S. Army Corps of Engineers	18
U.S. Forest Service	9
Idaho Department of Lands	8
Miscellaneous	<u>35</u>
TOTAL	154

### Hydropower Projects

Region 4 personnel spent an estimated 90 man-days in corresponding, reviewing, attending meetings, and making field inspections of proposed and existing hydropower projects. By the spring of 1989, 41 cogeneration type hydro plants were in operation in Region 4, or approximately 80% of the 51 cogeneration facilities in the state selling power to Idaho Power Company. The approximate maximum power production of these 41 plants is approximately 58.7 mw. Hazelton "A" hydro on Murtaugh Canal will go on the line in May of 1990 and will generate about 7.7 mw. Hazelton "B" (7.3 mw) and Wilson (5.7 mw), both proposed for the Northside Canal, have been placed on a "hold" status.

Approximately 30% of the cogeneration facilities in Region 4 are utilizing irrigation canal water and they produce about 51% of the power. Roughly 43% of the power is being produced by the four largest hydros utilizing irrigation canal water.

Cogeneration hydros now produce approximately 19% of the hydropower produced within Region 4. However, if the major Idaho Power Company hydros on the Snake River, from C.J. Strike to Hells Canyon and including American Falls, are included the amount of power they contribute dwindles to just over 3%.

The avoided cost rate (the cost a utility is able to avoid through the purchase of power from independent producers) was just under 4 cents per kilowatt hour in 1989. Due to now projected power shortages, the avoided cost is expected to rise to 5.75 cents per kilowatt hour by 1994. This rise in the avoided cost rate can be expected to spur interest in cogeneration plants.

### Miscellaneous Activities

1. Drought conditions necessitated numerous fish salvage operations below Magic Dam in mid and late summer in 1988.
2. We assisted the Division of Environmental Quality personnel on the Rock Creek Rural Clean Water project.
3. We cooperated with other agencies and entities on the Big Wood River stream stabilization work. Those working on the project include the U.S. Forest Service, the Bureau of Land Management, the Department of Transportation, Blaine County Planning and Zoning Administration, the City of Ketchum, and private landowners.

4. Work was continued on the interagency cooperative projects including: Cedar Draw Creek Clean Water Project, Vineyard Creek Project, and Sublett Reservoir and tributaries work.
5. Investigation of Cow Creek Reservoir in Elmore County as a Department purchase was continued. Establishing proper ownership of the property has delayed progress on the matter, but recent findings regarding this look encouraging.\_ If we are successful in obtaining this water we will manage it as a trophy trout fishery for which there is a very high local demand.

Submitted by:

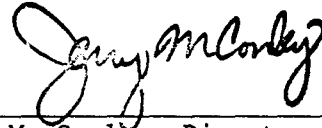
Fred E. Partridge  
Regional Fishery Biologist

Charles E. Corsi  
Regional Fishery Manager

Robert J. Bell  
Regional Fishery Manager

Approved by:

IDAHO DEPARTMENT OF FISH AND GAME



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Jerry M. Conley, Director

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Steven M. Huffaker, Chief  
Bureau of Fisheries

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Al Van Vooren  
Resident Fisheries Manager